

Sonalysts Combat Simulations  
*Dangerous Waters*™  
User Manual

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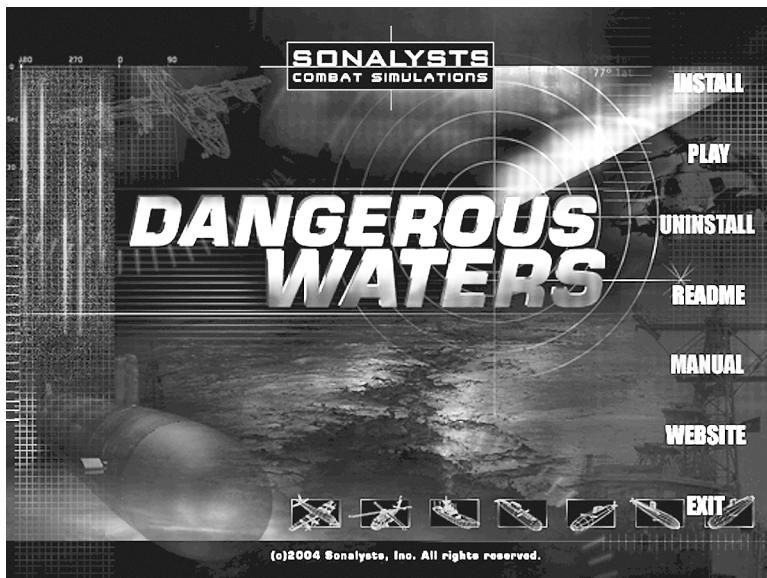
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# SECTION 1

# INSTALLATION GUIDE



# 1: INSTALLATION GUIDE

## SYSTEM REQUIREMENTS

### MINIMUM SPECIFICATIONS

- Windows 98SE/ME/2000/XP
- 550Mhz processor
- 128 MB RAM
- Eight-speed CD-ROM drive
- Direct 3D compliant Video Card with 32MB RAM, (with DirectX 9.0b compatible drivers)
- Sound Card with DirectX 9.0b compatible drivers
- Desktop Resolution of 800x600 @ 16-bit color depth
- 590MB hard-drive space for installation
- Internet or LAN connection required for multiplayer

### RECOMMENDED SYSTEM

The following upgrades from the minimum specifications are recommended:

- 1GHz+ processor
- 256 MB RAM
- Direct 3D compliant Video Card with 64MB RAM, (with DirectX 9.0b compatible drivers)
- 1GB hard-drive space for installation

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## TO INSTALL S.C.S. – DANGEROUS WATERS

1. Insert *S.C.S. - Dangerous Waters* CD disk #1 in your CD-ROM drive. When the install wizard appears, click INSTALL.
2. The *Dangerous Waters* Setup Wizard appears. Click NEXT to proceed to the next step. (You can click CANCEL at any point to exit the Setup Wizard.)
3. The Choose Destination Location window appears. Click NEXT to install the game to the default location or select BROWSE to select an alternative location, then click NEXT.
4. The Setup Type window appears. You must select FULL or TYPICAL before you can proceed. Click NEXT.
5. The Select Program Folder window appears. Click NEXT to install the game to the default Program File location or click BROWSE to select an alternate location, then click NEXT.

6. The Start Copying Files Window appears providing you with an opportunity to review your selections for type and locations before starting the copy process. To change your selections, click BACK. Click NEXT to continue.
7. A progress bar appears indicating that the files are being copied to your hard drive. Partway through this process you are prompted to insert disk #2. Remove disk #1, insert disk #2 then click OK.
8. Near the completion of the copy process you are prompted to insert disk #1 again. Remove disk #2, insert disk#1 then click OK.
9. You are prompted to add an icon to the desktop. Click YES or NO as desired.
10. The Adobe Acrobat Reader information window appears. Click YES.
11. You are prompted to install Voice Command Recognition software. Click YES or NO as desired.
12. You are prompted to install DirectX 9 if it is not installed. You must install DirectX 9 to run *S.C.S. – Dangerous Waters*. You are informed if DirectX 9 is already installed. Click OK.
13. The Initial Skill Level selection window appears. You must select Novice or Advanced settings as described in the wizard to continue. Click NEXT.
14. The InstallShield Wizard Complete window appears. Click FINISH.



*SECTION 2*

*WELCOME*

*GETTING STARTED*



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## 2: WELCOME/GETTING STARTED

Now you can command a surface, subsurface or air platform all in one game! S.C.S. - *Dangerous Waters* allows you to engage the enemy below as the commander of an Oliver Hazard Perry Class Guided Missile Fast Frigate, its MH-60R multi-mission helicopter or a P-3C Orion ASW/ASUW aircraft. Prowl the ocean depths in a U.S. Seawolf or Improved Los Angeles Class Nuclear Submarine or seek out enemy targets in a Russian Akula I Improved or Akula II Nuclear Submarine or an ultra quiet Russian or Chinese Kilo diesel sub!

Play the campaign from either the Blue (U.S. or U.S. and Russian alliance) or Red vantage point (Chinese or Chinese and Russian alliance).

Multiplayer missions pit you against players commanding the most capable submarines at sea or a deadly submarine hunter.

Multiplayer Multi-Station mode allows you to man a specific station aboard a ship, plane or sub with other players taking the role of other crewmembers on the same platform! See the *Multiplayer* section of this manual.

As the Commander of your platform you can relinquish control of various stations to your Autocrew or man all stations yourself. Give orders to your crew via voice commands, use the handy menu commands from the Task Bar or mouse commands in the Navigation Station. The Task Bar allows you to perform many maneuvering tasks from any station.

Create your own missions in S.C.S. - *Dangerous Waters* powerful Mission Editor. Information from the United States Naval Institute is available on all military ships and planes modeled in the game.

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## CONTROLLABLE PLATFORMS

Controllable platforms include sub classes from three countries and U.S. Navy ASW surface and air platforms. The following classes are controllable in S.C.S. - *Dangerous Waters*.

### U.S. PLATFORMS

#### ***Oliver Hazard Perry (FFG-7) Class***

Small, sleek and fast, Oliver Hazard Perry class guided missile frigates (FFGs) are uniquely capable warships, commonly referred to as a "Fleet work horse," to protect shipping, with particular emphasis as an Anti-Submarine Warfare (ASW) combatant. This ship class was designed to be cost efficient and therefore lacks a true multi-mission capability.

Nonetheless, these frigates are a tough ship capable of withstanding considerable damage as demonstrated by the USS Stark surviving a hit by two Exocet cruise missiles and the survival of USS Samuel B. Roberts after suffering a mine detonation. A significant combat upgrade for these ships came about from embarking multi-mission helicopters to extend the combat reach in terms of both weapons and sensor capabilities. This surface

combatant is capable of engaging and destroying targets on land, in the air, and on the sea; remaining at sea for extended periods of time, and continuing to operate in very rough sea conditions.

### **MH-60R Multi-mission Helicopter**

The MH-60R is an advanced multi-mission helicopter equipped with state of the art electronics and sonar including Multi-Mode Radar, Electronic Support Measures, and AQS-22 airborne low frequency dipping sonar (ALFS). Its Penguin missiles can engage surface combatants and its Hellfire missiles make it a threat to small surface craft and land targets alike! With its dipping sonar and the latest in sonobuoy processing the MH-60R can quickly detect, localize and attack enemy submarines with Mk 46 or Mk 50 torpedoes!

Its up to date sensors and its mission specific weapon loadouts make this an excellent combat asset that greatly expands the range of its host surface combatant.

The MH-60 R is a controllable platform and is embarked on the Perry class (FFG-7) and other U.S. ships in S.C.S. - *Dangerous Waters*.

### **P3-C Orion**

While its primary mission was originally anti-submarine warfare (ASW) and maritime patrol, the four-engine turboprop P-3C Orion has increasingly become a multi-mission platform as evidenced by its invaluable support of *Operation Iraqi Freedom* where it provided battlefield surveillance! Utilizing its long-range and the ability to remain on station for long periods of time, the P-3C patrolled the battlespace and provided instantaneous reports to troops on the ground.

Mission roles for the P-3C in addition to ASW now include anti-surface warfare (ASUW), carrier battle group support, over-the-horizon (OTH) surveillance and targeting, interdiction operations, and littoral warfare. To assist in its anti-surface role, new equipment has been installed including imaging radar and electro-optic sensors. ASW equipment in the P-3C includes magnetic anomaly detection (MAD) and sonobuoys including directional frequency and ranging (DIFAR) capability.

The P-3C can carry a variety of weapons depending on its assigned mission. Weapons include Mk 46 and Mk 50 torpedoes, and SLAM-ER and Maverick missiles for strike warfare. Mines can also be carried.

### **Seawolf (SSN 21) Class**

Countering the threat of the ultra-quiet non-nuclear subs acquired by third world countries is now a primary mission of U.S. nuclear attack submarines. This state-of-the-art U.S. attack submarine is the quietest nuclear powered submarine currently deployed by any country. With its superior stealth, a tactical speed higher than any other U.S. submarine, and its hardened sail, Seawolf stands ready to tackle missions as varied as the insertion of Special Forces to attacking threats under the polar ice cap. Her Tomahawk missiles make her a threat to inland targets up to 1,400 nm away and her Mk 48 ADCAP torpedoes are lethal to subs and ships alike.

## ***Los Angeles Improved (SSN 688(I)) Class***

The “backbone of the fleet”, the 688(I) class sub is one of the quietest submarines in operation today and is armed with state-of-the-art weaponry including Tomahawk land attack missiles and Mk 48 ADCAP torpedoes. Its hardened sail and bow planes make it available for missions under the ice. 688(I) class subs are available in sufficient numbers to ensure availability for missions around the world.

## **RUSSIAN PLATFORMS**

### ***Kilo SS & Kilo Improved SS Classes***

Dubbed “The Black Hole” by NATO personnel for its uncanny ability to disappear, the ultra quiet Kilo and its crew stand poised to protect littoral water from intrusion by enemy submarines and surface ships. Its six torpedo tubes can be loaded out with the latest in Russian wire-guided and wake homing torpedoes as well as anti-sub, anti-ship and land attack missiles making it a deadly opponent. With its anechoic hull coating, two 120-cell batteries providing 9,700 kw/hr and an air regeneration system providing enough breathable atmosphere for 260 hours of operations with a full crew, this is not your grandfather’s World War II diesel submarine!

### ***Akula 1 Improved SSN & Akula II SSN Classes***

Russia’s counterpart to the U.S. Los Angeles Class, the Improved Akula-I Class submarine is nearly as quiet as the 688(I). With six additional tubes external to the pressure hull, it is capable of carrying additional weapons or decoys.

Quieter than the Akula I Improved the Akula II is the quietest nuclear powered Russian submarine in existence. At low speed it is reported to be as quiet or quieter than the United States Improved Los Angeles class submarine. Also armed with six additional external tubes for weapons or countermeasures, the Akula-II is a formidable opponent.

## **CHINESE PLATFORMS (PROC)**

### ***Kilo SS & Kilo Improved SS Classes***

Uniquely suited for operations in the South China and East China Seas, five Russian built Kilo submarines significantly enhance the People’s Liberation Army Navy (PLAN’s) attack submarine fleet. One of the quietest submarines in operation when operating on battery, it is capable of detecting an enemy sub at a range far greater than the range at which it can be detected itself. This extremely capable sub with its loadout of anti-sub and anti-surface torpedoes and Russian built missiles stands ready to confront hostile naval forces and deny them access to sea lanes, and costal and naval facilities!

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## HOW TO USE THIS MANUAL

This manual is divided into the following sections. (A separate Mission Editor manual is found in electronic format on *S.C.S. – Dangerous Waters* CD 1 in the Manual folder.

**Install Guide:** Provides minimum and suggested system requirements and step-by-step instructions for installing *S.C.S. – Dangerous Waters*.

**Welcome/Getting Started:** This is the section you are reading now. This section defines terms as used in the manual and outlines game settings assumed in the manual. If your settings do not match those assumed, your experience will be different than those described in here. This section also provides a very brief overview of the game, how to get started and an overview of game elements that are common across all controllable platforms. You are also directed to the location of full explanations for game elements when appropriate.

**Main Menu:** Main Menu options with the exception of Mission Editor and Multiplayer are described in full here. Mission Editor is fully explained in a separate manual included on your game CDs. Multiplayer is described in its own section in this manual.

**Multiplayer:** How to host or join a multiplayer game is explained. Playing the game in Multi-Station mode is also described. In Multi-Station mode several players work together within a single platform, with each person manning a specific station or suite of stations.

**Training:** This section provides background needed to effectively use sonar sensors and the TMA station.

**Sonar School:** An introduction to sound transmission and sonar terms and concepts. A description of how to use the Sonobuoy Display windows (Grams) is found here.

**TMA Basics:** The principles of Target Motion Analysis (TMA) and how it works to create a firing solution are covered here.

**Navigation Station:** The game starts in the Navigation Station regardless of the platform you are commanding. The Navigation Station functions virtually the same regardless of Ownship selection. The basics of Navigation Station functionality are covered here. All other stations are covered separately according to platform.

**FFG Stations:** Explains all FFG stations and functionality.

**MH-60R Stations:** Explains all MH-60R stations and functionality

**P-3C Orion Stations:** Explains all P-3C Orion stations and functionality

**Kilo Stations:** Explains all Kilo stations and functionality.

**Akula Stations:** Explains all Akula stations and functionality.

**Seawolf Stations:** Explains all Seawolf (SSN 21 Class) stations and functionality.

**688(I) Stations:** Explains all 688(I) stations and functionality

**Appendix A:** Acronyms

**Appendix B:** Terms

**Appendix C:** Submarine Max and Mins

**Appendix D:** Ownship Sensor Names

**Appendix E: Credits:** A list of the people who created and contributed to the production of S.C.S. – *Dangerous Waters*

**Mission Editor:** S.C.S. – *Dangerous Waters* ships with the robust Mission Editor used to create the campaign and all missions in the game. The S.C.S. – *Dangerous Waters Mission Editor User Manual* is provided in electronic (pdf) format in the *Manual* Directory on S.C.S. – *Dangerous Waters* CD #1.

## ASSUMPTIONS IN MANUAL

This section defines terms as used in the manual. The writer assumes specific Options settings are selected in the *Options>Game* and *Crew* screens. If different *Game* and *Crew* options are selected, the descriptions seen here may not match your experience.

### Specific Options Settings

You were forced to select Advanced or Novice Settings when you installed S.C.S. – *Dangerous Waters*. While learning the game neither mode is perfect. This manual assumes the specific settings for *Game* and *Crew* Options as noted below.

### Crew Options Settings

This manual describes what the player must do to use each station; therefore, it assumes all Autocrew are off. If you have turned on any of your Autocrew your experience will not be what is described within this manual.

- ⇒ From the Main Menu click Options then Crew. Click the square in front of the type of platform you are commanding to select the Autocrew options for that Platform. Click **Defaults (Advanced)**. This turns off all Autocrew for that platform.

✓ **Note:** There is no Autocrew option for Auto Pilot for the P-3C and the MH-60R. Because flying is never your primary tasking in air platforms, Auto Pilot is on by default. When you fly the P-3C or MH-60R with a joystick you must switch the Auto Pilot to OFF; however, the Auto Pilot continues to work until you move the joystick. As soon as you leave that station to attend to your tasking on other screens, the Auto Pilot reverts to ON. Turn it OFF again when you return to the Pilot Station. See *Main Menu/Options/Crew* for information on Autocrew for each platform.

## Game Options Settings

While many game options can be considered cheats, some reflect realistic settings. Selecting Novice Game setting can enhance your enjoyment of the game while learning, by speeding up weapon and aircraft launch times and reducing the time needed to repair damage.

If you selected Advanced settings at install or have tweaked any of your Game Options settings we recommend clicking Defaults (Novice) in the lower left of the *Options>Game* screen.

The manual assumes the following settings are selected in *Options>Game* screen.

**Show Dead Platforms ON:** When ON destroyed platforms appear in 3D and on the Nav Map whether you have detected the platform or not. This feature is a cheat but provides you with feedback that you really have hit your target when you have no way of knowing otherwise. While you are learning the game, this feedback is reassuring that you are doing things correctly. The dead platform is a Truth object. It represents the actual identity of the platform and its actual location on the Nav Map and in the 3D view when the symbol is selected. Its symbol is greyed on the Nav Map to indicate it has been destroyed. You will continue to see the wire frame or solution representations as detected by your own sensors as well. (See *Navigation Station/2D Navigational Map* for in-depth information on the Nav Map and its symbols.)

**Show Truth OFF:** When ON, symbols for all objects in the mission display on the Nav Map, whether you have detected them or not. Each symbol appears in the contact's true location and reflects its accurate category and alliance ID.

**Show Allies OFF:** When ON this is the equivalent of Show Truth for Allies. The true locations and platform data for Ownside/friendly platforms appear on the Nav Map.

**Show Link Data ON:** Commanders of the FFG, MH-60R and the P-3C will see the Nav Map (and Geoplot) NTDS symbols for Link participants and all contacts currently held by Link participants. Submerged subs will not see Link data on the map at game start. Subs see Link data only when at comms depth with the radio antenna extended or when the floating wire is streamed and Ownship is shallow and traveling slow enough to receive data. Once your sub is out of radio contact Link data are no longer updated. See *Navigation Station/2D Navigational Map* section for in-depth information on the Nav Map, its symbols and Link information.)

**Weapon Quick Launch is ON:** When OFF weapon reloads reflect realistic times. When ON weapon reload and launch time units are in seconds instead of minutes.

**Aircraft Quick Launch ON:** When OFF the time it takes to launch the FFG's helicopter reflects a realistic time interval. When ON, aircraft launch time units are in seconds instead of minutes. (It takes a full hour to launch your helo when it is not in Alert 30 if this feature is OFF.)

**Quick Damage Repair ON:** When OFF damaged equipment repairs reflect realistic times. When ON, repair time takes seconds instead of minutes.

**Enable Wind OFF:** When ON, any Wind Region defined in the mission by the mission creator affects your Ownship aircraft or FFG navigation. Wind speed and direction are noted in the Task Bar for aircraft and the FFG. See Note below.

**Enable Currents OFF:** Any water region defined for a mission can influence Ownship sub and ship navigation. There is no way to determine the direction of currents. See Note Below.

- ✓ **Note:** The wind and currents function basically the same. Wind affects aircraft and surface ships and currents affect subs and ships. When enabled, crosswinds or currents push Ownship off course. Opposing winds or currents slow Ownship, while trailing winds or currents speed it up. If you order an exact speed via the Task Bar, your crew takes wind and currents into account in maintaining your ordered speed, but if you give a specific engine order, your actual speed may vary. Be aware that the speed readout on the Task Bar shows forward speed through air or water, not speed over the ground. If you've ordered an exact speed, your *indicated* speed may be higher if you're driving into a wind or current, or lower if you're riding with a trailing wind or current.

**Enable Waveriding ON:** When OFF, objects in the water in a high sea state will not follow waves, but will stay straight and level. This may cause models to submerge or float above the waves in 3D. This option should only be disabled to lighten CPU load for performance reasons. For further information on the Game options see *Main Menu/Options/Game*.

## Default Keyboard Controls Settings

This manual assumes the default keyboard control settings are in effect. If you have changed your hot key assignments in the *Options>Controls* page, the keyboard commands listed in the manual will not be accurate. Click **Defaults** at the bottom of the *Options>Controls* page to return any settings you have changed to those shipped with the game.

## Terms defined

In this manual the following terms are used as defined below:

### General Terms

- ❑ **Click:** Single left mouse button click
- ❑ **Right-click:** Single right mouse button click

### Platform Terms

- ❑ **Platform:** Any ship, sub or aircraft
- ❑ **Controllable Platform:** A ship, sub or aircraft that can be player controlled in the game.
- ❑ **Ownship:** Refers to the current controllable platform regardless of category. (Controllable aircraft are also referred to as Ownship.)

- ❑ **Ownside:** All platforms assigned to your side by the mission creator.
- ❑ **688(I):** Any controllable U.S. Improved Los Angeles class nuclear submarine.
- ❑ **Akula:** Any controllable Akula I Improved or Akula II class nuclear submarine. All Akula game interfaces are the same. Their weapons, top speed and noise levels differ.
- ❑ **FFG-7 or FFG:** Any controllable U.S. Oliver Hazard Perry (FFG-7) class surface ship.
- ❑ **Kilo:** Any controllable Kilo Project 877 or Kilo 636 class (Russian or Chinese) diesel submarine. All Kilo station interfaces are the same. Their weapons, top speed and noise levels differ.
- ❑ **MH-60R or Helo:** Any controllable U.S. MH-60R helicopter. The FFG's embarked MH-60R helo is also referred to as Helo even when it is not player controlled.
- ❑ **P-3C or P-3:** Any controllable U.S. P-3C Orion Update III AIM airplane.
- ❑ **Seawolf:** Any controllable U.S. Seawolf (SSN 21) class nuclear submarine.
- ❑ **VAB:** Variable Action Button. Button text and functionality changes when clicked. The FFG stations contain several VAB panels. The Seawolf Button Matrix panels are variable action buttons.

### In-Game Terms

- ❑ **Category:** Refers to a type of platform for example surface, subsurface, airplane (air) and helicopter (Helo.) Also refers to stationary (land), weapon (torpedo), missile, and mine.
- ❑ **Confidence:** Listed as Low, Medium or High, this refers to how confident you are that your classification of the contact is accurate. This is user assigned for contacts detected by Ownship sensors and Link assigned for Link contacts.
- ❑ **Contact:** Anything detected visually or by one of your ship's sensors. A contact is sometimes referred to as a track. A contact, or track, should not be confused with a tracker.
- ❑ **Gram:** Any of the small, rectangular display windows found in the FFG-7, MH-60R or P-3C platforms that display narrowband and SSP data transmitted from sonobuoys.
- ❑ **Hook:** To select a track symbol on the Nav Map or a Geoplot screen. Clicking on a track symbol "hooks" or selects it.
- ❑ **ID:** When seen alone, this word refers to the presumed alliance of a contact (Friendly, Hostile, Neutral, Unknown etc.)
- ❑ **Link:** A network of platforms (ships and aircraft) that provide position reports and sensor contact information via secure two-way UHF or HF radio transmissions. This assumes satellite transmission so the entire battlespace is covered if there are Link platforms in all corners of the battlespace.

- ❑ **Link Participant:** All platforms (and land bases) reporting in your current Link network. A Link is also modeled for Chinese and Russian subs when they are Ownship.
- ❑ **Link Contact:** A contact reported by a Link Participant.
- ❑ **Tag:** A number automatically assigned by the FFG towed array to detected frequencies. These numbers are internal to the Towed Array and are not the same as a Track number (Track ID). (Show Tags in the Nav Map refers to the assigned name of a platform.)
- ❑ **Track:** Anything detected visually or by one of your ship's sensors. A track is sometimes referred to as a contact. A contact, or track should not be confused with a tracker.
- ❑ **Track ID:** Each sub interface and the FFG interface refers to designated contacts with slightly different words. In this manual any reference to an alphanumeric designation, a Contact ID, or a Track ID refers to designations assigned when a contact is detected. This is a letter with a number appended when commanding a sub (e.g. S01, E01, R01, V01) or a four-digit number when controlling the FFG or aircraft. Link participants report four-digit Track IDs. All controllable platforms also have a Track, or Platform, ID.
- ❑ **Tracker:** A device used to automatically follow a sonar signal to which it is assigned. When a tracker is assigned to a sonar contact, called a track, periodic updates on the contact's bearing are sent to TMA. A tracker is not a track, but it 'tracks' a track.

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## GAMEPLAY OVERVIEW

This section contains important information for the player who likes to jump right in and start playing. If you only read one section of the manual, start here!

### GAMEPLAY

Mission tasking varies depending on the platform you are commanding. Whether you are tasked to find and destroy an enemy target, drop off Special Forces, engage or avoid an enemy platform, or track an ultra quiet submarine, you must be familiar with your platform's capabilities, sensors and weapons systems in order to best accomplish the assigned task. The stations for each platform are covered individually later in this manual.

Regardless of the type of platform you control (submarine, surface ship, helicopter or maritime patrol plane) your goal is to use that platform's various sensors to detect and identify targets. Using the tools at your disposal, you must classify the contact to determine whether it is a neutral, enemy or friendly ship, sub or aircraft, or a pod of whales. If you are tasked with destroying the contact you must determine its location and if appropriate its course, and engage the target with an appropriate weapon.

Depending on the type of platform you choose to control, your sensors can include active and passive sonar, sonobuoys or dipping sonar, Electronic Support Measures (ESM or EW), a periscope or binoculars, Magnetic

Anomaly Detector (MAD), or Radar, and Link data from other friendly platforms in your area.

In every mission you are assigned at least one task considered critical. A critical task must be completed to ensure a satisfactory mission outcome. These tasks are laid out in the mission brief or assigned in messages during gameplay and identified as Critical Goals in Mission Status and in Mission Debrief. Some tasks are secondary in importance. These are identified as non-critical goals.

You must complete assigned tasks while keeping your platform out of harm's way. You can man all stations yourself or, if desired, you can use the Autocrew to assist you with detecting, classifying and targeting contacts, but bear in mind they are not infallible.

## **Getting Started**

1. Create a player name from the *Sonalysts Combat Simulation – Dangerous Waters* Main Menu screen.
2. Click Missions.
3. Select a Single Mission Title and a controllable platform. Click OK.
  - See *Main Menu/Missions/Platform Selection Window* for information on selecting a controllable platform.
4. Read the brief then select the weapon icon button at the bottom of the screen.
5. From the Weapons Loadout screen ensure that your loadout is appropriate for the mission tasking. If not, change it. Click OK
6. Click OK in the Brief screen to load the mission. The Mission opens in the Navigation Station.
  - See *Navigation Station* for a full explanation of Nav Station functionality. Information on the NTDS Symbols is contained there along with other information important to gameplay.
7. Once in the mission, press the function keys to view all the stations or use the pop-up Stations Menu on the far left of the Task Bar. (All submarines in *S.C.S. – Dangerous Waters* carry shoulder launched Surface to Air Missiles. The SAM launcher is accessed from the Sail [F9] only when the sub is surfaced. The SAM Launcher screen is unavailable when the sub is submerged.)
  - See the Task Bar section of the Stations Menu for the platform you are controlling for full information about Task Bar functionality in that platform.
8. Learning how the stations work is your first order of business. See the Station Section of this manual appropriate for the platform you are commanding.
9. Detect, mark, track and or destroy contacts or complete other tasks as directed in the Mission Brief.

10. Press [Esc] then select Mission Status to check your progress in completing the mission goals.
11. When Mission Goals are complete, press [Esc] and select End Mission. (To save the mission to complete at a different time select Save or Save as.)
12. In the Mission Debrief Screen review the complete and incomplete goals or click REPLAY to see a replay of the mission just completed as seen from the Nav Map.
13. Click OK to return to the Main Menu. The debrief results for all missions played by the current Player Name are available in the Players Log.

## **Autocrew**

Each platform has several Autocrew to assist you. The manual assumes that all Autocrew are off for the purpose of explaining each station's functionality. However while you are learning one station it may be useful to turn ON the Autocrew for other stations. See *Main Menu/Options/Crew* for a brief description of all Autocrew. Each platform's Autocrew functionality is explained more fully at the end of each platform's Stations section.

## **Damage**

On occasion Ownship may incur damage from weapon impact, running aground, collision or some other means. Depending on the platform, you may receive a voice message or a text report may appear in the crew message area.

Whenever damage occurs a ship system may be temporarily or permanently out of commission depending on the extent of the damage and the location. The Damage slider in the upper right corner of the station slides out to reveal a wrench indicating that some portion of that station is damaged and no longer functioning. A wrench icon replaces the regular cursor over a button, gauge, switch etc if that portion of the system is damaged and currently unusable.

Further information is found in the Damage report window in the Task Bar. Unless instructed on a remedial course of action to repair the damage, for instance come to Periscope Depth and ventilate, there is nothing you can do to speed the damage recovery process short of turning on Quick Damage Repair at game start. If damage can be repaired it occurs automatically over time. Enabling Quick Damage Repair reduces the amount of time required to complete the repair.

## **COMMON STATIONS AND GAME ELEMENTS**

Some game stations, elements and functionality are the same regardless of the platform you choose to command. A brief overview is found below.

### **Task Bar**

The Task Bar is available at the bottom of all stations in the game and provides a pop-up Stations Menu for switching to other stations and a pop-

up Orders Menu for issuing common commands. The Task Bar also provides a means for performing basic maneuvers and viewing a history of damage reports, crew reports, radio messages and multiplayer chat messages. Maneuvering shortcuts and a means for accelerating time in the game are also available in the Task Bar.

Since subs, ships and aircraft have different stations and modes of maneuvering, the pop-up Stations and Orders Menus and Maneuvering Shortcuts are slightly different for each type of platform. The layout of the Task Bar is the same regardless of platform.

See the Stations section for the desired platform for a description of its Task Bar elements.

## ***Navigation Station (Brief Overview)***

The Navigation station is made up of three distinct areas: the 2D Navigation Map (Nav Map), the 3D View, and the Digital Data Indicator (DDI). The position of the Nav Map and the 3D View can be swapped or hidden by using the controls in the upper right corner of the station. For a full description of all aspects of the Navigation Station see the *Navigation Station* section of this manual.

### **2D Navigation Map**

The game opens at the Navigation Station, or the **Nav**. Here you see the Nav Map, a 2D map of the battle space. (You must scroll to see the entire space.)

**NTDS Symbols:** Once a contact is detected by one of your sensors or the Link it appears as a Naval Tactical Display System (NTDS) symbol on the Nav Map and it is assigned a track number used by the ships' systems when targeting that contact. Since all sensors report a detected contact and the Link reports contacts, in some cases two or more symbols may overlay one another if all reporting sensors agree as to the location. Press [Tab] to move between the contacts and view the DDI information for each individual contact. (See *Navigation Station/2D Navigation Map/NTDS Symbols* and *Navigation Station/2D Navigation Map/Contact Designations* for information on the map symbols and track numbering system used in *S.C.S. – Dangerous Waters*.)

**Link Data:** If you are commanding the FFG or one of the aircraft in the mission you will initially see Ownship and then all members of your Link and within a few seconds will also see all contacts reported by the Link. If you are commanding a submerged submarine you see only the Ownship symbol. Because you are not in contact with the Link when submerged you see no Link contacts. To see Link participants and their reported contacts, come to communications depth and extend the radio mast or stream the floating wire from the Radio/ESM station. Each sensor that detects a contact creates a contact symbol on the Nav Map and a contact ID for the detection, therefore multiple symbols will be present for a contact held by more than one sensor. In the subs and the FFG contacts detected by some of Ownship sensors can be merged in TMA to better localize the contact

and clean up the map. (See *Appendix C: Submarine Max and Mins* for a listing of Comms Depth for all subs.)

### 3D View

The Navigation Station also contains a 3D window, or **3D View**, for viewing a 3D model of a selected or 'hooked' contact. Until a contact is classified it appears only as a wire frame object or Area of Uncertainty (AOU) in the 3D View. Once you classify the contact (or it has been classified by the Link or the Autocrew) it then appears in the 3D view as a 3D model of that class. Because contacts can be detected both by the Link and by your own sensors it is likely that in some cases two 3D objects will appear close together in the 3D View. See *Navigation Station/3D View* for more information.

### DDI

Known information on a selected contact is available in the **Digital Data Indicator (DDI)** area of the screen. Complete information on the DDI is found in *Navigation Station/Digital Data Indicator (DDI)*.

### Classify Contact Dialog

Once you have detected a contact it is important to determine its class and alliance to ensure that you do not target friendly or neutral platforms. By using the libraries available in various stations on all controllable platforms you can determine the classification of unknown contacts.

Once you have determined the class of a contact and have a guess as to its alliance you can designate the contact's classification from the Nav Map using the **Classify Contact ...** dialog.

- ⇒ On the Nav Map click the desired contact then right-click on the contact to display the Contact Menu. Select **Classify Contact...**

You must determine the correct classification to enter by using information gathered at other stations. The stations utilized to determine the classification of a contact differ between platform types. See *Navigation Station/2D Navigation Station/Contact Menu/Classify Contact As...* for complete information on using this feature.

### Voice Commands

If you installed the speech recognition software (Microsoft's Speech Recognition Engine 5.1) when you installed *S.C.S. – Dangerous Waters* there are a variety of voice commands available during gameplay for each controllable platform. The document *Voice Commands.doc* resides on the *S.C.S. – Dangerous Waters* CD and contains a list of voice commands recognized by the game.

- ❑ Voice commands that correspond to keyboard commands can only be used when the keyboard command is appropriate (e.g., they are ignored when dialogs are visible.)
- ❑ Voice commands that correspond to the Task Bar's Orders Menu commands can be used from any station.

- ❑ Voice Commands that correspond to a Nav Map right-click menu only work when on the Nav Map.
- ❑ Voice commands are only recognized during gameplay and not when out-of-game screens such as the Options Menu are accessed during gameplay.

You can train your speech engine by visiting the speech control panel accessed via the Speech icon in the Windows 98, Windows 2000, Windows ME or Windows XP control panel. You can also improve the accuracy of the speech engine by adjusting the accuracy vs. performance slider in the speech control panel.

✓ **Note:** The speech recognition software is not compatible with Windows 95. If you attempt to install the game on a Windows 95 platform, the option to install the speech recognition software is not seen.

#### To utilize voice commands in the game:

1. In the Main Menu select *Options>Sound*.
2. Under the Speech heading select **Enabled** and, if desired, **Always On**.
  - ❑ Always On is only available when Enabled is checked. Both Options are greyed if you do not have the Speech Engine installed.
3. When only Enabled is selected on the *Options>Sound* page press and hold the speech key while issuing a valid voice command. By default the speech key is [W].
  - ❑ When the designated speech key is pressed during gameplay, voice recognition is listening and the speech engine interprets anything you say. When this key is released, voice recognition is not listening and it ignores anything you say.
4. When Always On is selected on the *Options>Sound* page issue a valid voice command as desired at any point during gameplay.
  - ❑ When the Always On option is checked, the designated speech key is ignored and the speech engine is always listening to what you say.

#### System Menu

The System Menu is available from any in-game station regardless of platform by pressing [Esc] during gameplay or by selecting System Menu from the Nav Map Menu. (Click the Nav Map to deselect any contacts then right-click on the Nav Map surface to display the Nav Map Menu.)

The following options are available:

**Resume:** Leave the System Menu and resume gameplay.

**Options:** Displays the Options Menu.

**USNI Reference:** Displays the USNI Browser

**Mission Status:** Displays the Mission Status screen giving you access to your player name, the mission name, score, elapsed time, the mission goals and a list of platforms destroyed up to this point in the game.

**Save:** Displays the Save Dialog then returns to the game.

**Save and Exit:** Displays the Save Dialog then exits the mission.

**End Mission:** Exits the mission without providing an opportunity to save the mission.

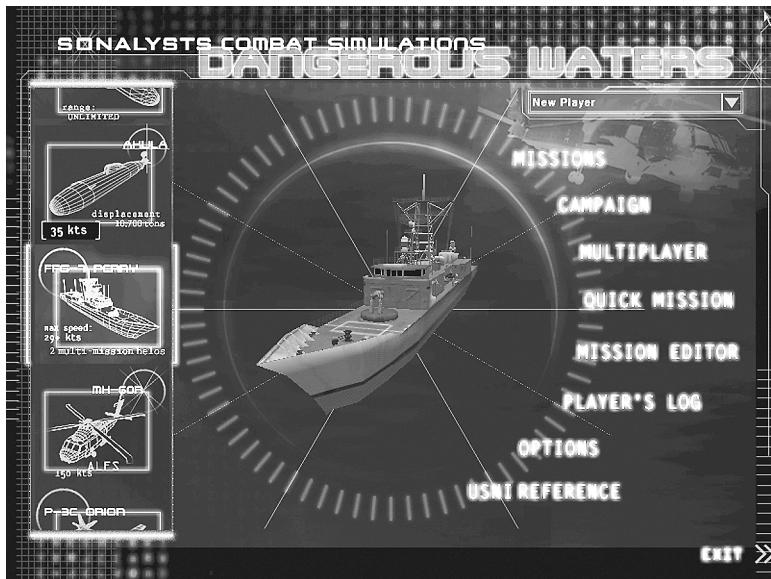
## PLAYING FROM THE NAVIGATION STATION

With all Autocrew turned on it is possible to play some aspects of the game from the Nav Station. Each platform has some elements that require your presence at specific stations, but with careful planning, and the use of the Task Bar's Orders Menu and Maneuver shortcuts, Voice commands and the Ownship and Contact right-click menus it is possible to attack hostile platforms and perform a variety of tasks from the Navigation station. See *Navigation Station/Playing From the Nav*.



## *SECTION 3*

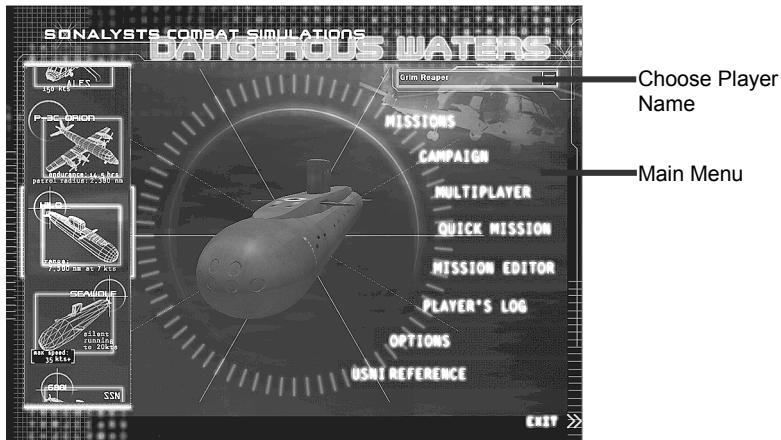
# *MAIN MENU*



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## 3: MAIN MENU

From S.C.S. - *Dangerous Waters* Main Menu you can set your player name, select single, campaign, multiplayer or quick missions, and access the Mission Editor to create or edit your own scenarios. From here you can also access the game's options where you adjust game, sound and 3D settings, view or reassign hot key designations, and set multiplayer options. The Main Menu also provides access to your current Play log and the U.S. Naval Institute information on the ships and weapons available in S.C.S. - *Dangerous Waters*.



### CHOOSE PLAYER NAME

Following the opening video, the Main Menu appears. To skip the opening video, press the spacebar.

Enter your player name in the Edit box at the upper right of the screen. Previously created player names appear in the drop-down list. If you have already created a name, click that name in the list. Your player "careers" are automatically tracked by the game. See *Main Menu/Player Log*.

### MISSIONS

Click Missions on the Main Menu to view the Missions screen. From here Single or Saved missions are selected. The components of the Missions screen are seen below.



## SELECTING A MISSION

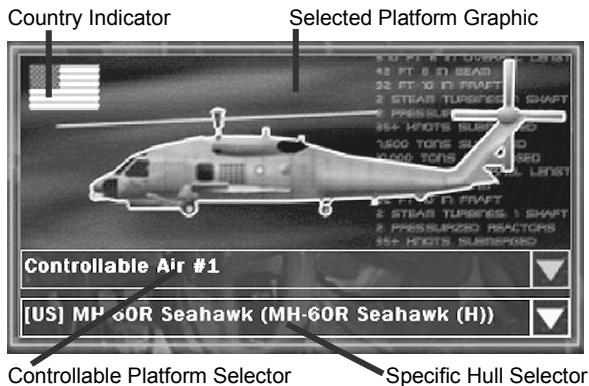
The steps for selecting a Single or Saved mission are identical.

1. In the Missions screen click **SINGLE** or **SAVED**. Mission names of that type appear in the Mission Title Selection Window. Stars preceding the mission name denote level of difficulty, from one star (easy) to four stars (most difficult).
2. Click the mission title of your choice. A description of the selected mission appears in the Mission Description window. The tasking overview for the default controllable platform appears in the Tasking window. (Alternate tasking may be assigned to other controllable platforms when they are available in a mission.)
3. Select an option from the **Controllable Platform Selector** drop-down. The drop-down contains the list of Controllable Platforms available in the selected mission. If the drop-down is greyed out, only one controllable platform is available in the mission. See *Platform Selection Window* below.
4. If the **Specific Hull Selector** is enabled (green) you can chose to command any named submarine or FFG in the list. Otherwise the platform shown is the only platform available in the mission.
5. To see another available mission, select a different mission title.
6. Click **CANCEL** to return to the Main Menu.
7. Click **OK** if you want to play the selected mission. The Mission Brief screen appears and displays complete tasking information. You can view or adjust the weapons loaded out for the selected platform in the

Weapon Loadout Screen accessed via the weapon icon button at the bottom of the Mission Brief screen.

## ***The Platform Selection Window***

The Platform Selection Window contains a graphic of the selected or default platform class and two drop-down lists. The upper drop-down list is the Controllable Platform Selector. The lower drop-down list is the Specific Hull Selector.



All missions have at least one controllable platform. If the mission designer has added more than one controllable platform to a mission each controllable platform can be selected in the Controllable Platform Selector drop-down.

## Controllable Platform Selector

The mission designer decides which of the seven possible controllable platform classes are controllable in a mission. In some missions the designer permits some controllable platforms to offer the player a choice of a specific named hull to command for the task. Asterisks, numbers and color all indicate additional choices as described below.

**Color implications:** When the text and drop-down arrow are grey the platform listed and shown in the graphic is the only type of controllable platform in the mission. When the Controllable Platform Selector drop-down arrow is green and the text is not greyed, additional controllable platforms can be selected.

**Asterisks:** When an asterisk precedes the Controllable Platform Selector option, additional options are available as described below:

**\*Controllable Surface:** The Specific Hull Selector is enabled and allows for the selection of any Oliver Hazard Perry class hull modeled in the game.

**\*Controllable Sub:** The Specific Hull Selector is enabled and allows for the selection of any submarine hull regardless of sub class or

country. The tasking as written applies to whichever sub is selected, regardless of country.

**\*Controllable Air:** While it is possible to create a scenario with this option (via the *Player Has Choice of Platform* option in the Mission Editor) no numbered or named 'hulls' for aircraft exist in S.C.S. – *Dangerous Waters*. Therefore only one option appears in the Specific Hull Selector when an asterisk appears before Controllable Air.

**Numbers:** Numbers (#1, #2 etc) sometimes follow the text in the Controllable Platform Selector.

- ❑ A number following Controllable Air indicates either a) both types of Controllable Air platforms have been added to the mission and can be selected in the Controllable Platform Selector or b) two or more air platforms of the same type have been added to the mission and can be selected in the Controllable Platform Selector. Each will have a different location and possibly different loadouts and/or tasking.
- ❑ When a number follows Controllable Sub, more than one Sub can be selected in the Controllable Platform Selector.
- ❑ When a number follows the FFG more than one FFG can be selected in the Controllable Platform Selector.

✓ **Note:** Missions with more than one controllable platform can be played as Multiplayer Missions. The number of controllable platforms in a mission determines the number of players that can play that mission. A number appears in front of Mission titles in the Multiplayer Missions screen indicating the number of controllable platforms in each mission. If the game session has been designated as a Multi-Station multiplayer game, the number of *Platforms* appears before the Mission Title. See the *Multiplayer* section of this manual.

### Specific Hull Selector

The platform name that appears in the Specific Hull Selector when you click OK is the platform you command in the mission. When the Specific Sub Selector is enabled you can choose any platform hull in the list. The tasking overview that appears in the Tasking Window applies to the platform selected, even if the platform is from a different country.

### Mission Brief

The Mission Brief Screen appears when you click OK in the Missions Screen. The Mission Brief screen provides the complete tasking brief and an opportunity to change your weapons loadout. This tasking is also available during gameplay in the Task Bar's Message History window accessed by clicking the green square history button.

1. Click the Weapons Loadout icon button at the bottom of the Mission Brief screen to review or alter your platform's loadout to better suit your mission needs. See *Weapons Loadout* below.
2. Click **OK** to begin the mission, or click **CANCEL** to return to the Mission Selection screen.

## Complete Mission Brief



Weapons Loadout Icon Button

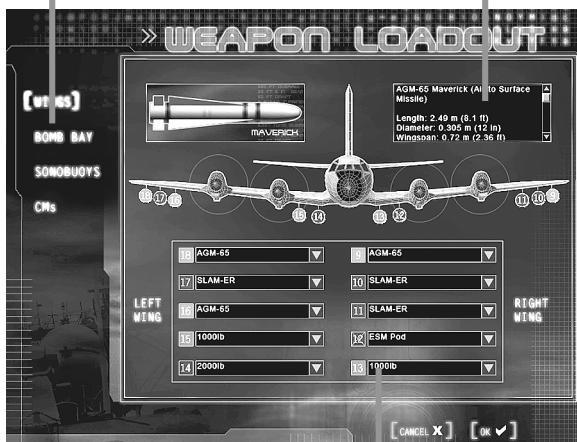
### Weapon Loadout

Depending on the mission tasking you may need to alter your default weapons loadout. The Weapons Loadout screen is accessed via the Weapons Loadout icon button in the Mission Brief screen. Here you can change the weapons loaded in the tubes or the bomb bay or wing pylons, change the number or type of stored weapons and sonobuoys, and adjust the loadout of your countermeasures (CMs).

- ✓ **Note:** The weapons available for each sub class vary. For instance only one hull (Improved Kilo Hull # 368) of the Chinese Kilos can carry the Klub Missile series. Only the weapons available on the specific sub class appear in the drop-down-lists.

Launcher Location or Stores

Information Window



Weapon Selection drop-down lists

### To View or Change Default Loadout:

In the Mission Brief screen click the Weapons Loadout icon button at the bottom of the screen. The Weapons Loadout screen appears with the default (top) weapon location button selected in the upper left.

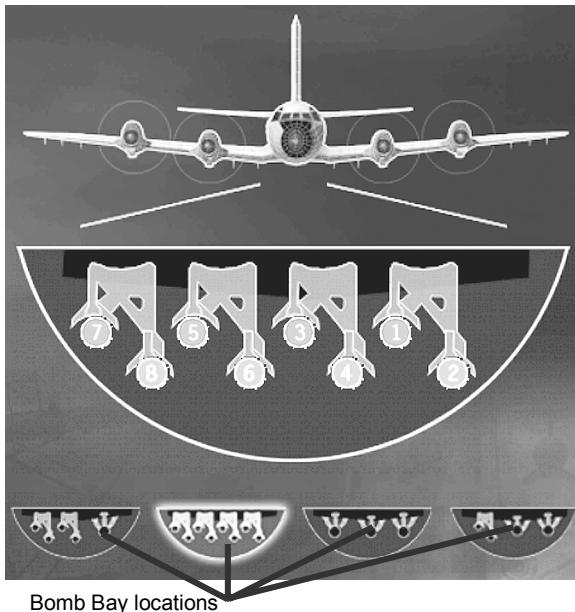
- ❑ The buttons along the left side of the screen represent the location of your controllable platform's weapon and CM launchers or pylons, and provide access to your stowed weapons, countermeasures (CMs) and, when applicable, sonobuoys. These buttons vary in number and name depending on the platform you are commanding.
- ⇒ Click each button in turn to view or change the current loadout in that location.

### To Change Tube or Pylon Weapons, External CMs

1. Click a location button at the left side of the screen. Select the desired weapon location. The loadout for a **tube or pylon/bomb bay** is represented by a numbered, colored circle or square on a wire frame representation of the platform. Each number represents a specific tube/pylon location. The name of the weapon loaded in each location is seen in a drop-down list associated with each tube or pylon number. The color of a circle or square on the wire frame coincides with the color assigned to represent each specific weapon.
2. Click the arrow in a weapon drop-down list associated with a specific location (tube, pylon, etc) and select a different weapon from the list to change the weapon loaded in that location.

✓ **Note:** Pylon # 12 on the P-3C in S.C.S. - *Dangerous Waters* is never available for loadout. The ESM pod is carried there.

- ❑ The P-3 Bomb Bay has four separate locations and each must be loaded out individually. Select Bomb Bay in the left side button menu then click one of the four semi-circles below the plane graphic to select the loadout for that bomb bay location.



3. Click OK to implement all of your changes and return to the Mission Brief screen.
4. Click CANCEL to ignore any changes you make on any of the Weapons Loadout screens and return to the Mission Brief screen.

### **Rack Stowed Weapons, Sonobuoys, Munitions**

In addition to weapons loaded in tubes or on other launchers, the subs and the FFG carry a store of weapons to replace expended weapons and CMs while underway. The controllable aircraft can carry extra sonobuoys and CMs to load and launch from internal launchers while airborne. To designate the number and type of items to be stowed, click the following buttons in the Weapons Loadout screen:

**Subs:** Stores

**FFG:** Ship Stores, MK 13

**P-3C:** Sonobuoys, CMs

**MH-60R:** Sonobuoys, CMs

1. Click the desired button. A screen showing the type of weapons, buoys, and/or countermeasures or other munitions that can be carried on your platform is displayed. In some platforms the number of items of

a specific type currently loaded in tubes is visible along with the current number of weapons of that type in the racks. While some platforms show both tube and rack loaded items on the same Stores screen, only rack stowed items can be changed here.

2. Click the right or left facing arrows associated with each item type to increase or decrease the number of that item stowed.

- ❑ The slash-separated numbers at the bottom of the Rack Stowed (or Stowed) column, represent the number of items of that type *currently* stowed followed by the total number of items of that type it is *possible* to stow. For example if you are commanding a Seawolf class sub the numbers 48/52 mean that there are currently 48 weapons stowed and it is possible to stow 52.
- ❑ In the Kilo, only tubes 5 and 6 allow for wire-guided weapons or the UUV. These tubes have separate racks to accommodate wire-guided items. Since the UUV must be wire-guided in order to return sensor data, the UUV can only be added to Racks 5 or 6 in the Kilo.
- ❑ In S.C.S. - *Dangerous Waters* sonobuoys descend to preset depths designated "Deep" (400 feet) or "Shallow" (90 feet). You can select sonobuoys of each preset type for your loadout. BT probes have no depth preset.

Decrease the quantity of this item stowed

Item Type	Increase the quantity of this item stowed			
	EXTERNAL STOWED			
	DEEP	SHALLOW		
DICASS	◀ 3 ▶	◀ 4 ▶		
DIFAR	◀ 3 ▶	◀ 4 ▶		
VLAD	◀ 3 ▶	◀ 4 ▶		
BT	◀ 4 ▶			
	25 / 25			

Total currently stowed / Maximum that can be stowed

3. Make the desired changes to all loadout screens before clicking OK.
  - ⇒ Click OK to implement your changes and return to the Mission Brief screen.
  - ⇒ Click CANCEL to ignore any changes you made on any of the screens and return to the Mission Brief screen.

✓ **Note:** The changed loadout is attached to your player name and becomes that platform's default loadout for all subsequent missions you play with the current player name until you change the loadout again.

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## CAMPAGN

Click Campaign in the Main Menu to access the Campaign Selection screen. From here you select the campaign mission to play and the platform to command in the mission.

### RUSSIAN REBELLION

Struggling with their newfound democracy and being steered by elected leadership that can ill afford new military initiatives, the Russian Navy is all but forgotten. The crews and officers do their best to maintain their cherished vessels but without the necessary resources their conditions steadily deteriorate. Further, the Russian government is taking steps that are increasingly authoritarian. In the Russian Far East, the military responds by staging a mutiny of massive proportions. The Pacific Fleet in Vladivostok and Petropavlovsk is seized by the newly formed Russian Rebels. Moscow responds with the mobilization of the Northern fleet from Murmansk to put down the rebellion and to regain control of the heart of their Pacific Fleet forces and ports. U.S. intelligence gives an ominous warning that ballistic missile submarines are among the captured assets and cannot be found in recent satellite imagery. The U.S. immediately takes the initiative in this matter of global security and deploys a naval task force to the Sea of Okhotsk. However, Russian leadership maintains that the insurgency is an internal matter subject to Russian sovereignty and warns the U.S. that any direct involvement in the conflict will be considered an act of aggression. The U.S. government disregards the warning and directs Navy officials to proceed through International waters to the eastern shores of Russia. The full mobilization of the U.S. and Russian navies in this volatile region provides opportunities for rival countries to renew hostilities and alter the established balance of power. The military forces of China, Japan, India, and Taiwan are put on full alert as they brace for war.

The Russian Rebellion is portrayed by Moscow as a “lawless act by desperate men resistant to change.” However U.S. surveillance and reconnaissance soon discovers that this rebellion is not so easily explained. Foreign merchant ships and naval vessels are detected moving covertly amongst the Rebels and pre-planned alliances are indicated. Perhaps the intentions of the Rebel forces are not as malevolent as they first appeared. Russian leadership is consistently quiet when questioned by the U.S. and maintains the threat that U.S. forces will be attacked if they interfere in what the Russians insist is an internal conflict. Meanwhile, Chinese forces are mobilizing. PLAN officials claim that the PRC is merely defending itself from the potentially devastating and potent force of both Russian government forces and rogue military assets controlled by the Rebels. However, the sudden build-up of substantial Chinese forces in the Taiwan Strait intimidates the Taiwanese and they initiate defensive war plans. The eastern world is on the brink of war, and the outcome is perilously uncertain.

## CAMPAIGN ORGANIZATION

In S.C.S. – *Dangerous Waters* you have the choice to participate in the campaign from multiple perspectives. You can control forces from the U.S., the Russian Loyalists, the Russian Rebels or the Chinese side, depending on the mission tasking and objectives. Your decisions have an impact not only on the direction of the conflict but may also dictate the alliances between countries. Those alliances will remain persistent for multiple missions or the entire campaign. However, in many instances the pre-existing alliances will be decided dynamically from the start of the campaign, and you must unravel the story behind the Russian conflict and determine the true intentions of each side. Make the wrong decision and the enemy forces you chose to destroy earlier in the campaign will no longer be available to defend you once the true alliances are revealed.

### To begin the Campaign:

1. From the Main Menu, click CAMPAIGN. The Campaign screen appears.
2. In the upper **Campaign Selection Window** click the name of the Campaign you wish to play: Mission names appear in the **Mission Selection Window**.
3. To view saved campaign missions click **Saved Missions** in the Campaign Selection Window. A list of saved campaign missions appears in the Mission Selection window.
4. Select the first (or next available) mission in the Mission Selection window and read the description and tasking.
5. When you have the option to select a platform to play in a mission, the text and down arrow seen in the Controllable Platform Selector is green. Click the green arrow and select a different platform. Tasking for the selected platform appears in the tasking window.

✓ **Note:** To proceed to the next mission, you must successfully complete all the current mission's critical goals. Critical and non-critical goals are listed in the Mission Status screen during gameplay. The Mission Status screen is accessible from the System Menu. Press [ESC] or left click on the Nav Map to deselect any objects then right-click on the Nav Map to access the Nav Map Menu then select System Menu

6. Click OK to receive the Mission Briefing.
7. The Mission Brief screen appears listing your tasking and offering you a chance to change your weapon loadout via the Weapons Loadout icon button at the bottom of the screen.
8. Click OK to start the mission or click CANCEL to return to the Campaign screen.

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## MULTIPLAYER

Up to thirty players can go head to head via Internet or a local network connection. Create alliances and play against other alliances or the A.I.

Multi-Station mode permits you and other players to man stations within the same platform and play as a team. For in-depth information, see Section 4: *Multiplayer* in this manual.

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## QUICK MISSION

Quick Mission provides you the opportunity to create a dynamic mission based on a few basic parameters that you select. Select any controllable platform to command in the mission, a basic mission type, a level of difficulty and general world location and quickly create a dynamic mission. The type of mission depends on the platform you have chosen to command.

### TO PLAY A QUICK MISSION

In the Main Menu click Quick Mission.

1. From the Controllable Platform drop-down list select the platform you want to command.
2. Click an available Mission Type option to select it.
3. From the Difficulty drop-down list select the desired level of difficulty Easy, Medium, or Hard.
  - ❑ The number of enemy contacts and their capabilities determine these levels of difficulty.
4. Click a Mission Location option to select a region of the world for the mission.
5. Click OK to move to the Mission Brief screen.
6. Click the Weapon Loadout icon button and alter your weapons loadout if necessary.
7. Click OK to return to the Mission Brief screen then click OK again to start the mission.

### REPLAYING A QUICK MISSION

If you find a Quick Mission that you really enjoyed playing you can play it again or share it with your friends.

1. In Player's Log click SINGLE to view Single missions. Quick Mission results are included with Single Missions. Find and open the results for the Quick Mission you just played. Quick missions do not have titles but are identified by a seed number. (The most recently played mission is located at the bottom of the list.) See *Main Menu/Players Log* for information on how missions are retained in the Log.

2. Click on the Seed number of the desired mission and make note of the seed number and all of the parameters (Controllable platform, Mission type, Difficulty and Region.)
3. Return to the Main Menu then click Quick Mission.
4. Enter the seed number into the Seed field.
5. Select all the same parameters as were initially selected.
6. Click OK to access the Mission Brief then OK to start the mission.

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## MISSION EDITOR

The Mission Editor is a powerful tool for creating and editing missions. This is the same tool used by the developers to create all missions in S.C.S. – *Dangerous Waters*. The Mission Editor's functionality is described in full in a separate PDF file located on CD # 1 of your S.C.S. – *Dangerous Waters* CDs in the Manual folder.

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## PLAYER'S LOG

S.C.S. – *Dangerous Waters* maintains a log for all player names you create. The log allows you to access the debrief report of missions attempted by the player name currently selected.

Missions are grouped by category represented by the text buttons at the left of the screen: Campaign or Single.

- Multiplayer and Quick Mission results are included with the Single Missions.
- The most recently played mission is found at the bottom of the list.
- When a mission is played multiple times, the game saves a) the highest scoring result for that mission and b) the results for the most recently played mission (if not the highest). So, for a given mission, you can have at most two entries in the log when that mission is played more than once.

1. At the left of the screen click the desired text button to select the type of missions you want to view. A list of all mission titles of that type undertaken by your current player name is displayed. It may be necessary to scroll down to see all mission titles.
2. Click a mission's title to see the results of that mission. The information displayed is the same as that displayed on the Mission Debrief screen at the conclusion of that mission. Slightly different information appears depending on the Mission Type.
3. Click BACK TO GAME LISTING at the bottom of the mission information to return to the list of missions. You may need to scroll to view this text.
4. Click OK or press [Esc] to return to the Main Menu.

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## OPTIONS

Selecting Options from the Main Menu displays the Options Menu. The text buttons at the left of the screen make up the Options Menu and indicate the type of options that are available. Click the name of the Options page you wish to view. Some types of options have multiple pages.

- ✓ **Note:** The options that are selected when you leave a game or mission remain selected in subsequent missions until you change them again.

### GAME OPTIONS

On the Game page you set Game and Nav Map zoom and scroll options. Some game options can be considered 'cheats', others set levels of environmental reality. A check mark in the square preceding an option indicates that option is ON or selected.

**Show Dead Platforms:** When ON, all platforms that are 100% damaged display in their actual locations on the Nav Map and their actual identity is displayed in the DDI and 3D View. Should the contact be killed by a platform other than Ownship, the contact symbol displays on the Nav Map whether you have detected it or not.

If you have detected the contact, the contact's symbol remains on the map moving at the course and speed designated in the TMA or reported solution even after the actual ship or object is destroyed. This can result in seeing two symbols and two 3D models for the same contact when this option is on.

For example, assume you command a sub and have a contact designated S01. You have a TMA solution on S01 that places it on bearing 235 at a range of 4000 yards but the contact is actually on bearing 239 at a range of 5000 yards. Additionally, you have classified S01 as a Krivak class frigate when it is actually a fishing boat. When you click S01 on the Nav Map the 3D model of a Krivak appears in 3D view.

Now suppose that you fire a torpedo at S01 using your TMA solution. Because your solution is close to the actual location of the contact the torpedo picks up the actual contact and destroys it. If you are attached to the torpedo you will see it go right through your TMA solution in 3D because it is not in the actual location of the contact. The torpedo proceeds on to the actual location of the contact and kills it. A symbol for the contact immediately appears at the actual location of the platform on the Nav Map and the model of the dead fishing boat appears in the 3D View if you select the symbol. Your S01 solution symbol and the Krivak model remain on the map until you go to the TMA station, select S01 and drop it.

If Show Dead Platforms is OFF, you never see in 3D what you have killed. Based on the sound of explosions and the loss of a signal on a given bearing you may assume that you have killed something. If you want to know for sure what you have killed without turning on this feature, go to the Mission Status screen and scroll down to the *Kills* section.

Be aware that if your missile or torpedo does not produce 100% damage, you will not see the wounded platform. You see explosion debris in 3D if you are attached to the weapon symbol on the Nav Map. If you can see the contact from the bridge binoculars, Gun Camera, the Sub periscope, the P-3 or MH-60 Pilot's station or the P-3's IR Camera you will see the damaged platform.

**Show Truth:** When ON, accurate NTDS symbols display for each object in the mission on the Nav Map at the true location of the entity. When a symbol is selected in Truth mode, the 3D object assigned to the class appears in the 3D View and accurate information about the contact is seen in the Data Display Indicator (DDI). When Show Truth is ON and a symbol is selected on the Nav Map, the information in the DDI contains no solution data and the actual name and class of the platform, its true course and speed and its level of damage are displayed.

When Truth is ON, no Contact IDs are seen in the submarine's Fire Control drop-down lists. You can only engage Truth contacts from the Nav Map using the Contact Menu's *Engage With* command or by shooting a Snapshot at the contact from a sub's Fire Control Target Display. Truth contacts can always be engaged by the FFG, P-3C and MH-60R.

- ✓ **Note:** When Show Truth is ON and Show Link is OFF, no track numbers appear on the Nav Map. When both Show Truth and Show Link are ON, the four-digit numbers seen on the Nav Map do not match the track numbers assigned by OS sensors or the Link that are seen when only Show Link Data is ON. In the FFG if you assign contacts to the Target Queue and then turn Truth ON, the targets in the Queue are cleared. If you assign Truth track numbers to the Target Queue then turn Show Truth OFF, the Target Queue is also cleared. Any tracks that have been assigned to a launcher or tube in one Truth mode are removed when you toggle the state of the Truth mode.

Truth is OFF by default and must be enabled here or by using the keyboard command or the Nav Map Menu. The default keyboard command is shown.

- ⇒ Press [Ctrl] + [Shift] + [T] to toggle the display of truth on the Navigation Map.
- ⇒ From the Nav Map Menu, select *Layers>Show Truth*. Select *Layers>Hide Truth* to turn truth OFF again.

- ✓ **Note:** A host in a multiplayer game can turn OFF the Show Truth capability so no players in the game can use it. See *Multiplayer/Multiplayer Options*. In a Multi-Station game the host is forced to set the truth mode for all players. Every player plays with the same Truth setting. The Host can still toggle the Truth mode and this toggles the Truth mode for all players regardless of side. The host should not do this unless all players approve.

**Show Allies:** When ON, the true location of Ownside platforms appear at their actual locations on the Nav Map. Accurate information appears in the

DDI when the contact is selected. The track numbers that appear for Allies (your Link participants) are different when Show Allies is ON than they are when Show Allies is OFF.

**Show Link Data:** When ON, friendly platforms appear on the Nav Map as blue symbols of the correct platform type and class. The Link provides a means for transmitting encrypted data between ships and/or aircraft on Ownside.

When Show Link Data is ON in *S.C.S. – Dangerous Waters* the location of all participants in the Link network as well as their contacts appear on the Nav Map in the form of an NTDS contact symbol. See *Navigation Station/2D Navigation Map* for further information on track numbers for Link participants and their contacts.

Clicking on a Link contact symbol on the Nav Map displays information in the DDI and the 3D view that is as accurate as the last report. The last known position of the contact is represented on the 2D Nav. Link data are reported on a time delay so the locations may not be exact but they are locations with a high level of confidence. Link information is updated on the Nav Map as long as the option is ON. When OFF the Link continues to report but the updates are not seen until you turn the option back ON.

If the Show Link Data option is ON when you leave a mission, it is also ON at the start of the next mission. Show Link Data is ON by default.

✓ **Note:** Link submarines are not seen in your Link data unless they are at comms depth with their radio mast extended. If you are commanding a submarine, you must go to comms depth and deploy the floating wire or raise the radio antenna to receive the Link data. If you are commanding a sub, you will only see another sub in a mission if that sub is at comms depth with his radio mast extended at the same time you are at comms depth with your radio mast extended.

⇒ From the Nav Map press [Shift] + [Ctrl] + [A] to toggle the display of Link Data for allied platforms and land sites or select *Layers>Show Link Data* (or *Hide Link Data*) from the Nav Map Menu.

✓ **Note:** Link contacts do not display in TMA drop-down lists. Some land sites are designated during mission design as Auto Detect. These show up on the Nav Map as Source: Link but with no specific Link source designated.

**Weapon Quick Launch:** When ON, the time it takes to unload and load submarine weapons and countermeasures and FFG torpedoes is reduced as follows:

- ❑ Weapon unload/load time drops from 16 – 18 minutes (depending on the sub) to approximately 35 seconds.
- ❑ Weapon load time drops from 8 – 9 minutes (depending on the sub) to 20 seconds.

- Countermeasure unload/load time drops from nearly 6 minutes to 14 seconds.
- Countermeasure load time drops from 3 minutes to 8 seconds.
- FFG Torpedo reload time is reduced from 30 minutes to 30 seconds.

If Weapon Quick Launch is OFF at the time a weapon reload is started, turning Quick Launch ON will not alter the reload time of the currently loading weapon. All subsequently launched weapons will load and Launch using Quick Launch times.

**Aircraft Quick Launch:** When ON, launch-time units are measured in seconds instead of minutes. The time to launch the helo from the FFG hangar is one hour. 30 minutes to get to Alert 30, another fifteen minutes to get to Alert 15, ten minutes to get to Alert 5 and five minutes to get to launch time. Enabling Aircraft Quick Launch reduces this time from 60 minutes to 60 seconds. Aircraft Quick Launch applies to the FFG's Helo and any other A.I. aircraft in the mission.

If Aircraft Quick Launch is OFF at the time an aircraft launch is ordered, turning Aircraft Quick Launch ON will not alter the launch time of the currently launching aircraft. All subsequently launched Aircraft will load using Quick Launch times.

**Quick Damage Repair:** When ON, the time required to repair damaged equipment is measured in seconds rather than minutes. Items that cannot be repaired are not affected by this option. If a repair has started with Quick Repair OFF, turning Quick Repair ON will not hasten the repair time of the current system. Subsequent damage will be repaired quickly.

**Enable Tool Tips:** When ON the name of the screen, button name or function and in some cases additional information displays when the cursor is held over game labels, buttons and entry fields.

**Enable Wind:** The mission designer determines if wind regions are defined in a mission. This option cannot be changed once a mission has started. When Enable Wind is ON, wind affects Ownship navigation. Crosswinds push your aircraft or FFG Ownship off course. Opposing winds slow your Ownship and trailing winds speed it up. If you order an exact speed via the Task Bar, your crew takes wind into account in maintaining your ordered speed. Note that the speed readout on the Task Bar shows forward speed through air or water, not speed over the ground. If you've ordered an exact speed, the *indicated* speed may be higher if you're heading into a wind, or lower if you have a trailing wind. Wind speed and direction are noted in the aircraft and FFG Task Bar. Novice players may wish to turn this option OFF

**Enable Currents:** The mission designer determines if water regions (currents) are defined in a mission. This option cannot be changed once a mission has started. Any water region defined for a mission by the mission designer produces water currents that affect navigation when Ownship is a sub or the FFG. Crosscurrents can push your ship off course. Heading directly into a current slows your ship, while moving with the currents increases your speed. If you order an exact speed via the Task Bar, the crew takes currents into account in maintaining your ordered speed, but if

you give a specific engine order, your actual speed may vary. Note that the speed readout on the Task Bar shows forward speed through water, not speed over the ground. If you've ordered an exact speed, your *indicated* speed may be higher if you are driving into a current, or lower if you are riding with a trailing current. There is no way to determine the direction of currents. Novice players may wish to turn this option OFF.

**Enable Waveriding:** When ON, the 3D platforms ride the waves realistically based on the sea state set when the mission was created. When OFF, objects in the water in a high sea state will not follow waves, but will stay straight and level. This may cause models to submerge or float above the waves in 3D. This option should only be disabled to lighten CPU load for performance reasons.

## 3D OPTIONS

These two pages of options allow for setting screen resolution, 3D effects and testing options. Changes you make can be viewed in the 3D Window. The following two items bear additional explanation.

- ⇒ Select **Disable 3D** on the second page of options to completely disable 3D in a mission. The Host in a multiplayer game can choose to disable 3D for all players or allow them to make their own choice. See *Multiplayer/Multiplayer Options*.
- ⇒ Select **Windowed** to run *S.C.S. – Dangerous Waters* in a smaller window. This is especially useful when reading on-line documentation.

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**Tip:** If you experience banding or pixilated graphics in your 3D view, try turning off any anti-aliasing settings you may have adjusted in the DirectX panel on your computer.

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## CREW OPTIONS

Each controllable platform has several Autocrew options. Each can be tuned on or off before game start at the option screen. During gameplay, use the Autocrew slider button, in the upper left of any station that has an Autocrew, to toggle the state of that Autocrew without returning to the Options screen. You can also access the Options screen from the System Menu during gameplay by pressing [Esc] (default hot key.)

- Clicking Defaults (Novice) turns ON all Autocrew options.
- Clicking Defaults (Advanced) turns OFF all Autocrew options.

Each type of platform has a unique set of Autocrew pages. Click the desired platform type at the top of the screen to access that platform's options. When ON (check-marked) Autocrew perform specific game tasks as follows:

### Sub

**Use Radar Autocrew:** When ON, Radar Autocrew marks and updates all Radar contacts as long as the Radar is on.

**Use TMA Autocrew:** When ON, TMA Autocrew merges contacts, performs TMA assessment, and enters Firing Solutions for all designated contacts.

- ✓ **Note:** When the TMA Autocrew is ON you cannot move the ruler or enter data into the trial solution fields.

**Use Sonar Broadband/Narrowband Autocrew:** When ON, the Sonar Autocrew marks contacts in Narrowband sonar and assigns trackers. (Trackers appear in both Narrowband and Broadband displays) He then commences classifying the contact in Narrowband. Once classified, the contact's symbol on the Nav Map changes shape to reflect the classification determined by the Broadband/Narrowband Sonar Autocrew. You must still assign an alliance ID to the contact from the Contact Menu's *Designate Category/ID> ID* option. See *Navigation Station/2D Navigation Map/Contact Menu*.

- ✓ **Note:** When Broadband/Narrowband Sonar Autocrew is ON you can still assign trackers and mark contacts. In some cases you may be quicker than he is. You can also move the Narrowband Cursor to designate the area for the Autocrew to search.

**Use Sonar Active Intercept Autocrew:** When ON the Autocrew marks all contacts detected in Active Intercept.

**Use Fire Control Autocrew:** When ON, the Fire Control Autocrew enters presets appropriate for the contact. The contact must be categorized (surface or subsurface) and have a firing solution, not just a line of bearing, before it can be assigned to a tube. Autocrew does not assign contacts to a tube.

- ✓ **Note:** Be aware that if you classify a contact as a surface ship when it is really a submarine, the Fire Control Autocrew enters presets appropriate for a surface ship. He uses your classification and the existing TMA firing solution to determine appropriate presets, even if your classification and firing solution are wrong.

## Air

**Use Acoustic Autocrew:** When ON, Acoustic Autocrew switches between channels, clears channels as needed to support Directional mode, and places buoys in Directional mode. Acoustic Autocrew does not place buoys in Active mode. In Directional mode he marks and classifies contacts.

**Use ESM Autocrew:** When ON, Autocrew marks ESM contacts but does not classify them. (MAD contacts are marked automatically when the MAD sensor is ON. While MAD shares the station with ESM, it is not tied to the ESM Autocrew.)

**Use Radar Autocrew:** When ON, Radar Autocrew marks contacts and sends position updates to the Nav Map as long as the Radar is ON.

**Use TACCO Autocrew:** When ON, TACCO Autocrew enters torpedo presets appropriate for the selected contact. You must select the contact and the weapon to be dropped or launched. You cannot enter torpedo presets when the Autocrew is on.

**Use Countermeasure Autocrew:** When ON, the Countermeasure Autocrew takes evasive maneuvers and launches chaff and flares when a missile is locked on your Ownship aircraft.

## **Helo**

**Use ATO Autocrew:** When ON, ATO Autocrew enters Penguin missile and torpedo presets appropriate for the contact. You must select the weapon to be dropped or launched. You cannot enter presets other than runout bearing when the Autocrew is on.

**Use SENSO Acoustic Autocrew:** When ON, Acoustic Autocrew switches between sonobuoys, places buoys in Directional mode, and clears channels as needed to support Directional mode. Acoustic Autocrew does not place buoys in Active mode.

**Use SENSO Dipping Sonar:** When ON, Autocrew marks contacts in Passive Mode. Autocrew does not mark Active contacts nor classify contacts in passive mode.

**Use SENSO ESM Autocrew:** When ON Autocrew marks ESM contacts but does not classify them. (MAD contacts are marked automatically when the MAD sensor is ON. While MAD shares the station with ESM, it is not tied to the ESM Autocrew.)

**Use SENSO Radar Autocrew:** When ON, Radar Autocrew marks contacts and sends position updates to the Nav Map as long as the Radar is on.

**Use Countermeasure Autocrew:** When ON, the Countermeasure Autocrew takes evasive maneuvers and launches chaff and flares when a missile is locked on your Ownship aircraft.

## **Surface**

**Use Acoustic Autocrew:** When ON, Acoustic Autocrew switches between hot sonobuoys, places buoys in Directional mode in Gram windows A - D (see note below), clears channels as needed to support Directional mode and marks and classifies Directional contacts. Acoustic Autocrew does not place buoys in Active mode, classify contacts in Omni mode or switch receiver modes (Ship, Air or Air/Ship modes.)

- ✓ **Note:** On the FFG, only display windows (gram displays) A – D can be set to Active or Directional Mode. If your helo is not aloft and you or your Acoustic Autocrew want to mark Directional contacts, the player must set the Receiver mode to SHIP/SHIP. To view Helo sonobuoy data in Gram windows A – D you must SYNC with the Helo in ASTAC and set Link mode to ACOUSTIC and display windows A – D must be set to AIR/SHIP.

**Use EW Autocrew:** When ON EW Autocrew marks contacts. He does not apply classes or classify the contacts.

**Use Towed Array Autocrew:** When ON the Towed Array Autocrew marks contacts, assigns ATF (trackers), and resolves ambiguous contacts.

**Use TMA Autocrew:** When ON, the FFG's TMA Autocrew merges contacts, performs TMA assessment, and enters Firing Solutions for all designated contacts. When ON, the TMA Autocrew also tears the page when the OS indicator light reaches the edge of the page.

- ✓ **Note:** Be aware that zooming in the range when the OS indicator is close to but not yet at the edge of the page will cause the Autocrew to tear off the page and lose the lines that were there.

**Use Torpedo Control Autocrew:** When ON Autocrew enters presets appropriate for the selected target.

**Use Countermeasure Autocrew:** When ON the Autocrew launches chaff and flares when incoming missiles are detected.

## SOUND OPTIONS

From the Sound options page you can enable voice commands as well as in-game sound and music options. A list of available English voice commands is found in *VoiceCommands.doc* located on both of the S.C.S. – Dangerous Waters CDs in the *Manual* directory.

**Enabled Only:** This option is used in conjunction with Voice Commands. When Enabled Only is ON and the designated speech key is pressed during gameplay, voice recognition is listening and the speech engine interprets anything you say. When this key is released, voice recognition is not listening and it ignores anything you say

- ⇒ Press and hold the speech key while issuing a valid voice commands. By default the speech key is [W].

**Always On:** This option is used in conjunction Voice Commands. When Always On is selected, the designated speech key is ignored and the speech engine is always listening to what you say.

- ⇒ Issue a valid voice command as desired at any point during gameplay.

### Page 2 of Sound Options:

**Status Messages:** This area reports any sound initialization errors indicating if the sound engine was successfully initialized and how many buffers were created. If you are having sound or sound card issues, check this page for additional information.

**Enable Special Effects:** This option is enabled only if the current machine supports this capability. When enabled effects such as reverb, audio level adjustment and other effects are applied to the sound during the game. The Special Effects option is used to mute the

volume of the 3D sound when inside the FFG Bridge and other areas in the game.

## CONTROLS OPTIONS

The Controls pages display the current hot key assignments for the Sub, Surface, and Air platforms as well as 2D Map, 3D View and General game functions. This manual assumes the default key assignments are in effect but you can change key assignments as desired.

### ***Explanation of Controls***

While most of the keyboard hot-key options are fairly self-explanatory a few require further explanation. These are covered below:

**General Controls:** These are controls that are not specific to the Nav Map or any specific controllable platform.

**“Escape” Menu:** System Menu. [Esc] is the default hot key. The manual refers to this menu as the System Menu in all places.

**Mission Status:** Mission Status screen provides information about the current game during gameplay (player name, controllable platforms, current status of goal completion.). Mission Status is accessed via the System Menu during gameplay.

**Keyboard Course/Speed /Depth or Altitude Change:** These options provide a means for entering an exact number in the Task Bar’s Course, Speed, and Depth (Alt) fields rather than clicking on the digits. Press the keyboard combination for the desired option. When the digits in that field change color *quickly* enter the desired digits via the keyboard.

**Map Controls:** These options control Navigation Map functionality.

**Hide/Show Entity Truth:** Shows the true identity and location for all platforms in the game. See *Options>Game>Show Truth*

**Terminate Action:** This refers to canceling the creation of a Map Object (such as a navigation mark, range circle, or waypoint insertion) prior to the placement of the object. When one of those options is selected the cursor changes shape until the action is completed. Terminate Action causes the cursor to return to normal.

**Add Manual Solution:** A manual solution places a yellow NTDS Symbol indicating an Unknown Category/Unknown ID on the Map at the location of the cursor. For more information on how to use a Manual Contact see *Navigation Station/2D Navigation Map/Nav Map Menu/Add Manual Solution*.

**Promote to Link:** Select this option to provide the link participants with your position report and assessment of the selected contact. This is most useful in Multiplayer games although you may want to use it in single player games if you want the Link participants to attack a contact you designate as hostile. See *Navigation Station/2D Navigation Map/Contact Menu/Promoting a Contact to Link*.

**3D Options:** These controls refer to the 3D view on the Navigation Station.

**Toggle Cinematic Camera:** When this option is activated it jumps the 3D view to wherever the 'action' is (a missile launch, missile hit etc.)

## **Changing Hot Key Assignments**

To change hot key assignments from the *Options>Controls* pages:

1. Double-click the text of the option you want to change. The option is highlighted and the text changes color.
2. Press the desired new key or key combination. An alert message appears if that key or key combination is already assigned to another command and displays the name of the command currently assigned the key(s) you pressed.
3. Click YES to swap the two key assignments. Click NO to maintain the current hot key settings.
4. Click OK at the bottom of the Options Menu to accept all changes. Click CANCEL to ignore all changes and retain your original settings.

## **Program Joystick to fly P-3C and MH-60R**

1. Ensure that the joystick is attached to the computer according to the joystick instructions.
2. From the Controls page click AIR/HELO to select it. A check mark indicates the option is selected.
3. Double click a line option in the list then move the joystick control as desired to associate that movement with the selected option. Items with no hot key assignment are options that relate to a Joystick only.
4. Continue until all listed options have been associated with a movement.

## **MULTIPLAYER OPTIONS**

Multiplayer options are only available to the host in a multiplayer game during the setup for a multiplayer game. Options you set here are enabled when you host a Multiplayer game. If you join a Multiplayer game any options you set here are disabled. When you host you can also set these options from the Gameroom. Multiplayer Options are explained in full in the Multiplayer section of this manual. See *Multiplayer/Multiplayer Options*.

## **SAVING OPTION CHANGES**

**To save options changes:** Click OK to apply all changes made on any page. The Options Menu closes.

**To exit the Options Menu without enabling any changes:** Click CANCEL. The Options Menu closes.

## **RESTORING DEFAULT SETTINGS**

Default settings can be restored by option type. (Game, 3D, Crew, Sound, Controls and Multiplayer.)

⇒ Select the desired type of option then click Defaults at the bottom of the page to set that type of options to the default settings shipped with the game. Each option type has a separate Defaults button. Some Options have Novice and Advanced Settings. See Novice and Advanced Defaults below.

There are six pages of Controls options. (General, Map, 3D, Sub, Air/Helo, Surface) The defaults can be restored to each page individually. Likewise, the multiple pages of Crew options can be set by individual platform. Crew Options defaults have both Novice or Advanced settings. See below.

## NOVICE AND ADVANCED DEFAULTS

The first time you run S.C.S. – *Dangerous Waters* you will notice that some Game and Crew options are turned on or off at game startup depending on whether you selected Novice or Advanced settings during game installation.

⇒ To switch from one setting to the other or to restore the original settings if you have altered them select Defaults (Novice) or Defaults (Advanced) as desired from each page that contains those options.

If a page has only one Defaults button, the default options are the same for both novice and advanced players.

✓ **Note:** This manual assumes Advanced **CREW** options and Novice **GAME** options are selected. If you have selected other Options settings, your game experience will be slightly different than described in this manual.

### Advanced Defaults

- Game** options: Turns ON Show Link Data, Enable Tool Tips, Enable Wind, Enable Currents, and Enable Waveriding. All other Game options are OFF.
- Crew** options: Turns OFF all Autocrew.

### Novice Defaults

- Game** options: Turns ON Show Dead Platforms, Show Link Data, Weapon Quick Launch, Aircraft Quick Launch, Quick Damage Repair, Enable Tool Tips and Enable Waveriding. All other Game options are OFF.
- Crew** Options: Turns ON all Autocrew options.

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## USNI REFERENCE

Data from the U.S. Naval Institute (USNI) was used as the source for the information in the in-game USNI Reference browser, and for the performance parameters used in the game databases. Any deviations from USNI data for gameplay purposes are noted in the browser entries.

# USING THE BROWSER

## To access Reference Information from the Main Menu:

1. Click USNI REFERENCE on the Main Menu. The Information Browser opens.
2. Click the desired country and platform name or the desired weapon type and the weapon name about which you want to learn more. The browser shows the text entry by default.
3. Click TEXT, PHOTO or 3D at the left to view the designated type of entry.
4. Press the right and left arrow keys to page through the text, photo or 3D entries of a given type for the selected country or weapon type
5. Click the house (home) icon to return to the table of contents.
6. Click OK to return to the Main Menu.

## To manipulate the 3D object in the browser:

- ⇒ Press the spacebar or any arrow key to stop the rotation of the 3D object.
- ⇒ Press [S] to start the object rotating again.

[Ctrl] + Click and drag or right-click and drag: Zooms in/out on the selected object.

[Ctrl] + Arrow Keys or click and drag: Rotates the camera above, under and around the object.

Select Country or Weapon Type      Select specific platform or weapon



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Close Browser

## To display the browser from any screen during gameplay:

- ⇒ Press [Esc] to access the System Menu or click the Nav Map the right-click to display the Nav Menu and select System Menu from the Nav Map Menu. Select USNI Reference.
- ⇒ Click OK to close the browser and return to the game.

## PLATFORM-SPECIFIC INFORMATION

You can quickly access information on a selected contact in the game or in the Mission Editor.

### During Gameplay:

- ⇒ Select the contact on the Nav Map then press [Alt] + [I].

The USNI Browser opens to the entry for the selected platform. Be aware that the browser provides information on the platform *as classified by you*. If you select a contact you have classified as a Kirov, the browser entry for Kirov is displayed, even if the contact is really a Slava.

- ✓ **Note:** If Show Truth is ON, the browser displays the correct entry for a selected contact.

- ⇒ Click OK to return to the game.

### In Mission Editor:

- ⇒ Assign a country, class and name to the platform. Select the icon on the map and press [Alt] + [I]. The browser opens to information on the selected platform.
- ⇒ Click OK to return to the Mission Editor.

- ✓ **Note:** No USNI information is available for land buildings, civilian aircraft and sailing vessels. During gameplay and in the Mission Editor, the browser's Main Menu displays if you attempt to access platform-specific information about a contact that has no browser entry.

---

## EXIT

To exit the Main Menu:

- ⇒ Click EXIT. An S.C.S. - *Dangerous Waters* message box appears asking you to confirm that you want to leave the game.
- ⇒ Click OK to exit to Windows.
- ⇒ Click CANCEL to return to the Main Menu.

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**Tip:** Press the spacebar or click the screen to bypass the credits.

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## SECTION 4

# MULTIPLAYER



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## 4: MULTIPLAYER

S.C.S. - *Dangerous Waters* allows you to host or join multiplayer games on a local area network or over the Internet. New in S.C.S. – *Dangerous Waters* is Multi-Station mode. In a Multi-station game a team of players are assigned stations on a single platform each taking one or several stations to man as desired.

A multi-manned platform can play against the AI (Artificial Intelligence) or against other multi-manned platforms in a multiplayer Multi-Station game. See *Multiplayer/Multi-Station Mode* for instructions on setting up a multiplayer game in Multi-Station mode.

### TO HOST A MULTIPLAYER GAME

As Host you select the mission, players and options available to all players. You decide if the session is a regular Multiplayer game or a Multi-Station game by selecting (or deselecting) the **Host Multi-Station** game option at the bottom of the Configuration screen. See *Multiplayer/Multi-Station Mode* later in this section. Multiplayer mode is covered here.

1. From the Main Menu, click **MULTIPLAYER** to reach the Multiplayer CONFIGURATION screen
2. Click **HOST**. Host options appear on the Multiplayer Configuration screen.
3. Enter a name for your game in Session Name.
4. If desired, click the appropriate check-box to select either or both of the following. A checkmark indicates the item is selected.
  - ⇒ Select **Require Password to Connect** then enter a password in the Password field.
  - ⇒ Select **Host Multi-Station game** to make platform station selection available in this session. See *Multiplayer/Multi-Station Mode* later in this section.

**Tip:** Be sure to share the password with fellow players prior to starting the mission.

5. Click **OK** to enter the CONNECTIONS screen.
6. Click the desired connection mode to select it.
7. Click **OK** to enter the GAMEROOM.

### Gameroom (Multiplayer Host Options)

As players join the game their names appear in the Name column of the Gameroom. (Host options for Multi-Station Mode are covered later in this chapter. See *Multiplayer/Multi-Station Mode (Host Options)*.)

1. Click **MISSION SELECTION** to display the Multiplayer Missions screen. (All Single missions with more than one controllable platform are available to play in the Multiplayer Missions Screen).
2. Select a mission from the list of titles. The number of possible **PLAYERS** in a mission is shown before the mission title. The number of stars indicates the level of difficulty of the mission.
3. Select a platform to command from the Controllable Platform Selector and Specific Hull Selector list. While a platform appears by default, that is not your selected platform until you select it. For more information on platform selection and the Controllable Platform Selector and Hull Selector see *Main Menu/Missions*.
4. Click **OK** to apply your selections and return to the Gameroom.
5. Brief and Weapon Loadout buttons are now selectable and the name of the submarine you selected appears in the Platform column following your player name.
  - ⇒ Click **BRIEF** to read the tasking for this mission.
  - ⇒ Click **WEAPON LOADOUT** to adjust your platform's loadout based on the tasking.
6. The Host determines which options are allowed in a multiplayer game.
  - ⇒ Click **OPTIONS** to set the options that are available to all players in this multiplayer game. See *Multiplayer/Multiplayer Options* later in the chapter.
  - ⇒ Click **OK** to apply your selections and return to the Game Room.
  - ⇒ Click **CANCEL** to return to the Game Room without changing any Options.
7. When all desired players have joined and indicate they are ready to start, click **PLAY**.
8. To deny game access to a specific player, select the player's name then click **REFUSE PLAYER**.

---

## TO JOIN A MULTIPLAYER GAME

This section covers joining a multiplayer game. Steps for joining a Multi-Station game appear later in this chapter. See *Multiplayer/Multi-Station Mode/Multi-Station (Join Options)*.

1. From the Main Menu, click **MULTIPLAYER** to reach the Multiplayer screen.
2. In the CONFIGURATIONS screen click **OK** to search for all open sessions. If you know it, enter a specific Host name or IP address in the edit field to access the game hosted by that computer. Click **OK**. The CONNECTIONS screen appears.
3. Click the desired type of connection to select it then click **OK** to enter the Lobby.

## LOBBY

The Lobby screen is divided into three sections or windows:

The **SESSION** window displays the names of any hosted sessions. The highlighted name is the selected session.

- The letters **MS** appear after the Session Name when the session is a **Multi-Station** game.
- The letter **Y** appears after a session name under the padlock icon if a password is required to join the selected session. An **N** indicates that no password is required.
- Player/Max:** The number of players currently connected is followed by the total number of connections supported by *S.C.S. – Dangerous Waters*.
- The Ping rate to the host is shown in the PING column.

The **PLAYERS** window displays the names of those players connected to the selected session.

The **MISSION DESCRIPTION** window displays a description of the mission if the selected Session Host has selected a mission.

1. Click the name of the game session you want to join.
2. Click **OK** to enter the Gameroom.
  - If you do not have the selected scenario or have a different version of the scenario the host computer notifies you and offers to send it to you. Click **OK** in the message box to transfer the scenario and enter the Gameroom. If you click **CANCEL** in this message box you enter the Gameroom but the only available option is Cancel.

✓ **Note:** The scenario transferred by the Host is sent to your Incoming directory. The incoming file does not overwrite a mission by the same name that exists in your Scenario directory. If the Host changes the mission and sends it again, this new (changed) file will overwrite the version in the Incoming directory.

Join Hosted Session Names Session is a Multi-Station Game (MS)  
Password required (Y/N)



Connected Players

## GAMEROOM (MULTIPLAYER JOIN OPTIONS)

Once the Host has selected a mission, the options at the left of the Gameroom screen are selectable.

- ✓ **Note:** If the host has not selected a scenario before you enter the Gameroom and subsequently selects a mission that you don't have or that is different from your version, you are notified via an error message that the host can send you the scenario. Click **OK** to continue. This scenario is placed in the Incoming directory, not in the Scenario directory.

1. Click **PLATFORM SELECTION** to select a platform to command in the mission. The Multiplayer Missions screen appears showing the name of the selected mission. The number of stars at the beginning of a row indicates the level of mission difficulty. (One star is easiest, four stars is most difficult). The number of possible players in the mission precedes the name of the mission.
2. From the Controllable Platform Selector dropdown list in the upper right, select a controllable platform. Platforms selected by other players are unavailable and list a player's name in parentheses.
3. When you have made your selection click **OK** to return to the Gameroom.
4. Click **OPTIONS** to select or view the Multiplayer options allowed by the Host. Set any allowable options in the Game, Crew or 3D Options pages as desired.

- ❑ Be aware that the host controls which options may be set, must be set or cannot be set. If the host disallows Show Truth, you will not be able to see truth even if you have Show Truth enabled in your game options. See *Multiplayer/Multiplayer Options* later in this section.

5. Click **BRIEF** to read the tasking for this mission.
6. Once you have selected a platform to command click **WEAPON LOADOUT** to adjust your platform's weapons loadout.
  - ⇒ Click **OK** in the Weapon Loadout screen to accept any changes you want to implement. Click **CANCEL** to negate any changes you made.
7. Click **READY** to notify the host you are ready to play. If you need to unready to adjust your loadout, click **READY** again to return to the Gameroom. Clicking **Cancel** takes you back to the Lobby.

---

## MULTI-STATION MODE

In Multiplayer Multi-Station mode two or more players can man different stations on the same platform and play against platforms manned by the AI or other teams of players manning a single platform. Each player assigned to a single platform is responsible for one or more stations as assigned or selected. If for example, FFG Player 1 is assigned the Towed Array Station on the FFG, FFG Player 2 cannot access the Towed Array Station and cannot use voice, keyboard or right-click menus to access the Towed Array station or make any changes there. Player 2 has access only to his own assigned stations.

Players assigned to the same platform should agree on station assignments although it is possible for any player on a given platform to unassign and reassign stations to other platform members. Any player assigned to a platform can adjust the Weapons Loadout.

<p>✓ <b>Note:</b> If a player in a Multi-Station game drops out, his stations remain unmanned.</p>
--

### MULTI-STATION MODE (HOST OPTIONS)

The Host in a multiplayer game decides if the mission is to be played in Multi-Station mode. The host is forced to decide if all players play with Truth on or OFF. Players do not have a choice and the host must pick one mode or the other.

1. In the Main Menu, select **MULTIPLAYER**.
2. The **CONFIGURATION** screen appears. Enter a Session Name. If desired, indicate if a password is required to join and enter the password.

3. Click the square in front of **Host Multi-Station game** if no check mark is visible there. When a check mark appears in front of the Multi-Station option, click **OK**.
4. Select a connection type from the **CONNECTIONS** screen then click **OK**.
5. The Gameroom appears. Click **MISSION SELECTION** to access the Mission Menu and Controllable Platform Selector.
6. The Mission Menu now lists mission titles as before but the number of *Platforms* in a mission now appears instead of the number of *Players*. Select a mission and a platform from the Controllable Platform Selector. Click **OK** to return to the Gameroom.
  - Each platform in the mission can be selected as a Multi-station platform. In a mission with 4 platforms, each of the platforms can be played in Multi-Station mode so only the number of platforms and stations on those platforms limits the number of players.
7. Click **ASSIGN STATIONS**. IN the Stations dialog that appears, click your player name to select it if it is not already selected. Click the name of a station on the right then click the left facing arrow in the center of the dialog to assign that station to the selected name. Select as many stations as desired or as agreed upon with fellow team members. Click **OK**.
  - Other players manning the same platform can access that platform's **ASSIGN STATION** dialog one at a time. Click **OK** following your selection to free the dialog for other players to select stations.
  - A message appears informing you which stations are currently unassigned. All stations must be assigned before game start.

✓ **Note:** If a player manning stations on your platform drops out of the game, his stations are not accessible. Functions performed at that station can no longer be performed.

8. Click **OPTIONS** then Multi-player Options to set options that are available to or forced upon other players. See *Multiplayer/Multiplayer Options*.
  - Because track numbers differ when Show Truth is ON, all players in a Multi-Station game are forced to play with the same Truth setting to avoid confusion. The host determines if Truth is ON or OFF for all players.

✓ **Note:** In Multi-Station mode it is important not to force the player to have Autocrew ON. The player could be left with nothing to do at his station since some Autocrew functions lock out any player interaction at the station. It is recommended that you force the players to have all Autocrew Options OFF for Multi-Station games or leave him with the possibility of turning Autocrew ON or OFF as desired.

9. To deny game access to a specific player, select the player name and click **REFUSE PLAYER**.
10. When all players have clicked **READY**, click **PLAY**.

✓ **Note:** You are prevented from starting a Multi-Station mission until each station on every platform is assigned. The Host is notified of unassigned stations on any platform when he clicks **PLAY**. The Host must then notify players via chat to assign all stations on the indicated platform(s). The Host cannot assign stations to platforms other than his own.

## MULTI-STATION MODE (JOIN OPTIONS)

There is no way to tell if a game is a Multi-Station game from the Lobby or when you initially enter the Gameroom. Multi-Station games are identifiable from the Mission Selection screen. In Multi-Station mode the number of *Platforms* is listed in the column in front of the mission name instead of the number of *Players*. Additionally a platform already selected by one player is still selectable by other players. No player names are attached to a platform.

1. Select a Host in the Lobby.
2. In the Gameroom, notice which players are currently assigned to a specific platform if you want to team with specific players. Click **MISSION SELECTION**.
  - ❑ To join a platform as part of that platform's team, select the desired platform name in the Controllable Platform Selector.
  - ❑ If other controllable platforms are available in the mission, select a different platform and wait for other players to join your platform's team. If no one else joins your team you must assign all stations to yourself.
3. Click **OK** to apply your platform selection and return to the Gameroom.
4. Click **ASSIGN STATIONS**. Ensure that your player name is selected in the Stations dialog. Select a station name on the right then click the left-facing arrow in the center of the dialog to assign that station to yourself. Select as few or as many stations as agreed upon with your teammates. Click **OK** to accept your station assignments and return to the Gameroom.
  - ❑ If another member of your team is selecting station assignments, you are prevented from accessing the Assign Stations screen until he has completed his selections.
  - ❑ You can select a station assigned to another player on your platform and move that station into the unassigned side by clicking the right-facing arrow. All stations must be assigned before the Host can start the game. The Host can only change station assignments for the platform he is on.

5. Click **OPTIONS** then Multiplayer Options to see which options the host has set. Set any options he has allowed. See *Multiplayer/Multiplayer Options*.
6. The **WEAPON LOADOUT** button is only enabled if you are assigned the appropriate station on your selected platform. If you are assigned one of the stations noted below, the button is available. Click to alter your weapon loadout based on the Mission Brief.

**P-3: TACCO**

**MH-60: ATO**

**Subs:** Fire Control

✓ **Note:** The FFG always plays with the default loadout. No player has access to the Weapon Loadout.

7. Click **READY** to notify the host that you are ready to play. The Host will notify you via chat if all stations on your platform are not assigned. Click **READY** again to return to the Gameroom. Be aware that clicking Cancel returns you to the Lobby. Click **ASSIGN STATIONS** and ensure that all stations are assigned to someone on your team, and then click **READY** again.

---

## MULTIPLAYER OPTIONS

In the Gameroom click **OPTIONS** to display the buttons used to access Multiplayer Options and other Options pages available in S.C.S. – *Dangerous Waters*. From Multiplayer Options the host sets specific options that apply to all players. Only the host can set options in the Multiplayer Options pages but those joining the game should view the Multiplayer Options pages to see which options the host has set and/or allowed.

The host can:

- Force all players to use specific options.
- Prevent all players from using specific options.
- Allow players to use specific options if they so choose.

The Multiplayer Options contains three pages of options.

- ⇒ Click the right and/or left facing double arrow button in the lower corners of the options screen to page through all options.

Each Multiplayer Options page contains two columns of check boxes.

If the host checks a box in the first column it indicates his desire to control the option setting that follows in that row. The second column contains check boxes associated with options from the Game, Crew and 3D pages.

When the host selects a box in the Controlled by Host column he can either force or prevent the player from using the option that follows in that row.

If the host does not select a box in column one, the joining player is free to set the option in that row from the appropriate Option page if he so desires.

<b>Controlled by Host:</b>	<b>Settings:</b>
<b>Checked</b>	<b>Checked:</b> All players forced to use this option.
<b>Checked</b>	<b>Blank:</b> Players prevented from using the option.
<b>No check</b>	<b>X:</b> Players can set this option if desired.

**Note:** The joining player can only view what the host is setting in the Multiplayer Options screen. Joiners must visit the Options Game, Crew or 3D pages to set any allowable options. In the Gameroom click Options then the type of Options you wish to view.

Host controls the option in this row    All players forced to use this option



All players prevented from using this option

Any players can set this option on Game options page if they so desire

## Host Controlled Options

The host may, if he chooses, control the following options by selecting or deselecting check boxes as described above:

- Autocrew options:** When the Host enables an Autocrew option, players can set that specific option in *Options>Crew*. (See *Main Menu/Options/Crew* for a brief description of all Autocrew options.)
- Game options:** When the Host enables a Game option, players can set that specific option in *Options>Game*. (See *Main Menu/Options/Game* for a brief description of all Game options.)

**Tip:** Do not prevent players from seeing Link Data. Unless Show Link Data is enabled, a player driving the FFG will not be able to see the radar returns from his deployed helicopter.

- ✓ **Note:** In a Multi-Station game, the host must force all players to play with Truth ON or OFF. He is not permitted to allow players to choose. This is because Truth track numbers are different than tracks marked by the Link and OS Sensors. If some players on a platform are viewing Truth track numbers and some are viewing Link and OS sensor assigned track numbers, confusion ensues and difficulty assigning a track to a weapon can occur.
- Disable 3D option:** When the Host disables 3D, the 3D View window does not appear in the Navigation Station for any player in the game

regardless of platform. The 3D view in Periscope, Bridge, Sail Bridge, Machine gun and Pilot station all function as usual.

- ❑ **Allow Engage With Menus option:** When the host disallows *Engage With* menus no player in the game can use the Nav Map's right-click *Engage With* menus to engage contacts. Because the *Engage With* menus do most of the work for you and prevent you from firing at contacts that are out of range, many consider it a cheat. To level the playing field, it can be disallowed in Multiplayer and Multi-station games.
- ❑ **Disable Multiplayer Options during Game option.** When this is selected no player is allowed to change the state of any Multiplayer options during gameplay.

## MULTIPLAYER DEFAULT SETTINGS

The host can set default options if he so chooses. Joining players cannot set Multiplayer defaults.

### To set Novice Settings:

- ⇒ Click **DEFAULTS (NOVICE)**. By default no *Controlled by Host* options are selected.
- ⇒ To see suggested defaults, click in every *Controlled by Host* option in the first column. The suggested settings appear check marked in the Second column.

### To set Advanced Defaults:

- ⇒ Click **DEFAULTS (ADVANCED)**. The host controls all options and the only options enabled in the Settings column are those that give players the most realistic experience. 3D is disabled in the Nav Station and Options cannot be changed during gameplay.

**Tip:** If you are joining a game, make sure that you visit the Multiplayer Options page to see which options your host has allowed. You can set allowable options from the Gameroom Options menus.

## CHAT

The Chat feature is available in the Gameroom and during gameplay.

### To chat in the Gameroom:

1. Type a message in the Chat Box at the bottom of the screen then press [Enter] or click **SEND**.
2. Messages appear in the Message window above the Chat Box.

- ❑ Messages sent from the Game Room chat appear to all players in the Game Room and in the Assign Stations screen when in Multi-station mode.
- ❑ Messages sent from players in the Assign Stations dialog only appear to players currently on the same platform in the Gameroom and to the

sender in the Assign Stations screen. These messages are appended with "[Platform]" indicating that only players on the same platform as the sender received that message.



### In-Game Chat:

1. Press [T] to compose a message to be sent only to members of your team (same platform). This is available only in Multi-Station mode. Platform specific messages are trailed by "[Platform]" in the chat message window in the Gameroom, Assign Stations dialog, and in-game.
2. Press [D] to compose a message to be sent to all members on Ownside.
3. Press [A] to compose a message to be sent to all players in the game.
4. Press [Enter] to send your message.
5. All in-game chat messages appear in the Multiplayer Chat History window. Click the yellow triangle History Selection Button to display the Multiplayer Chat messages.

**Note:** The yellow triangle flashes in the Task Bar to notify you that you have a chat message if you are viewing a different history.

## GAMEPLAY DIFFERENCES IN MULTIPLAYER

While gameplay is mostly the same in a multiplayer game, some features respond differently or not at all in multiplayer games. These are described briefly below:

### Pause in Multiplayer:

- Only the host can pause a multiplayer game.
- If the host minimizes the game, the game is paused for all players. As soon as he maximizes the game window, the game resumes.

**Note:** It is possible to run the game in windowed mode. This allows a player to work on other tasks without minimizing the game. See *Main Menu/Options/3d/ Windowed* for more information.

**Time Acceleration** is not available in multiplayer.

**Save Game** is not available for multiplayer games.

**Exiting/Host Exits:** When the host exits from a Multiplayer game, he returns to the Gameroom. Only the players from the original session can see him there. The session is not available to new players. To add new

players, the Host must back out of Gameroom to the Connections station and click OK to start a new session. Original players will have to join that new session along with any new players.

**Exiting/Client player exits:** If a player exits a game before the host, that player is out of the game session, and can only be accepted back if the host starts a new game session.

## PROMOTING CONTACTS TO THE LINK

While AI driven Link participants always share their Link data with you, player controlled platforms that are part of your Ownside Link must specifically promote a contact to the Link before you can see it. You must do the same before they can see your contacts. A submarine player has an additional handicap in that he must be at comms depth with his radio mast raised before his own location can be seen by other Link participants and before he can promote a contact to the link.

### To Promote a Contact to the Link

1. Select one of your local contacts (contacts detected by one of your Ownship (OS) sensors).
2. Ensure that you have provided as much information as possible about the contact. This should include the platform type and ID. Create an accurate TMA solution if possible (FFG and Subs).
3. When your contact symbol reflects its category (ship, air, sub, land) and ID (hostile, unknown, neutral etc.) and a solution, select it and from the right-click Contact Menu select **Promote To Link**.
  - The contact symbol along with the track number assigned by your reporting sensor is now visible to other air and surface Link participants. Ownside submarines will only see the promoted contact if they are at comms depth with their radio mast extended at the time of the promotion.
  - Since submarines have a unique track numbering scheme, the four-digit equivalent of the sub's alphanumeric is broadcast to the Link. This number is seen in parentheses next to the time promoted in the Nav Station's DDI for the promoting submarine.

## MH-60R MULTIPLAYER GAMEPLAY DIFFERENCES

When Ownship is the MH-60R and you are the deployed helo of a FFG manned by another player in a Multiplayer or Multi-Station game, some sharing of control may be requested by the FFG (SHIP). You will notice lights flashing on the LINK Panel of the ATO station.

**LINK / NAV CONTROL:** The FFG can request control of the helo from you in order to enter waypoints for you to follow. At any point you can take back Nav Control by clicking HELO in the ATO Station.

- ❑ When the SHIP requests Nav Control, the SHIP and HELO lights on the LINK Nav Control panel both flash until you switch the toggle to SHIP mode giving the SHIP waypoint control.
- ❑ When the SHIP has control and has placed waypoints for you to follow (Flight, Buoy, or Weapon) you cannot add waypoints of your own. You can still order course, altitude and speed changes that will deviate from the flight path entered by the FFG.
  - ⇒ To return to the flight path and waypoints entered by the FFG, select FOLLOW WAYPOINTS from the Orders or Ownship Menu's Navigate option.
- ❑ You can still drop buoys and torpedoes before you reach the assigned drop point (which may annoy the FFG player since you have a limited number of these items.) If the FFG has ordered weapon or buoy drop waypoints and you elect to drop all torpedoes or buoys of the requested type before the appropriate waypoint is reached, the waypoint is removed from the Nav Map and the Geoplot of both the Heli and the FFG.
- ❑ If you are flying the Heli with a joystick, you still have control as usual. It will be up to you to fly to the waypoints assigned by the SHIP. If you leave the pilot station Auto Pilot comes on automatically. You must select Follow Waypoints from the *Orders>Navigate* menu or from the Nav Map's *Ownship>Navigate* menu to set OS to follow the FFG designated waypoints.

**LINK / DATA LINK:** As long as SYNC is established, the FFG chooses which type of data (Radar or Acoustic) to receive from your Heli. You may notice that the DATA LINK switch moves from RADAR to ACOUSTIC without your interference. The FGG is receiving the selected type of data. You do not need to have your Acoustic station processing data for the FFG to receive Acoustic data, but you must have your RADAR on before he can view your radar contacts. Watch for Chat messages or note that the RADAR mode is selected in ATO, then make sure that your Radar is on.

## FFG MULTIPLAYER GAMEPLAY DIFFERENCES

In Multiplayer or Multi-Station games you may encounter occasions when your MH-60R Heli is deployed at mission start and manned by another player or a team of players. This results in some differences in the ASTAC station relative to Heli Control, Link Mode and Heli Recovery,

### ASTAC Station Differences

**HELO CONTROL:** You may wish to request control of the deployed MH-60R manned by another player so you can place specific flight, buoy drop or torpedo drop waypoints or view his radar returns. The steps for requesting Ship control of the deployed helo are the same as in Single player.

From the ASTAC Geoplot select your deployed Heli's symbol to establish SYNC. The HELOCONTROL and LINK MODE buttons are enabled. Click

SHIP. In Single player you automatically are granted ship control of the Heli. In a Multiplayer game, however, control of the Heli is not guaranteed. You must wait for the player in the ATO Station on the MH-60R to agree to this request and switch his NAV CONTROL switch to the SHIP position. The Heli player does not have to relinquish control if he doesn't want to. If he does not move the switch, you cannot place any waypoints for him to follow. Additionally, the Heli player can take back Nav Control of his platform at any point. He does not have to request permission to take back Nav Control. He just flips the switch.

**LINK MODE:** Once SYNC is established you can choose to receive Radar or Acoustic data from your deployed Heli. You do not need his permission to view Acoustic data. Acoustic is selected by default and can be processed at your Acoustic Station even if the player in the Heli is not processing sonobuoy data. While you can set the mode to Radar, if the player in the helicopter has his radar off, you are not receiving helo radar data until the Heli player turns his Radar ON. You must coordinate with the player in the helicopter to turn on the radar via chat or some other means of communication if he has not observed the blinking lights in ATO. Heli Radar contacts are automatically processed and marked as FFG local contacts as long as REMRO is ON.

**HELO RECOVERY:** If another player or team of players mans your deployed Heli, the RECOVER button in HELO STATUS is disabled for that Heli. The Heli player must select *Navigate>Return to Base* from the Ownship or Orders Menu or land manually with a joystick if he wants to return to the flight deck.

## ***Navigation Station Difference***

When another player mans your deployed helo, the Contact Menu's *Engage With> Heli 1 (or 2) [X] Missile options* are not available. You can still place torpedo waypoints with the Heli player's permission. See ASTAC Differences above.

## ***Weapons Coordinator/Target Queue***

In a Multi-Station Game, the player manning the Weapons Coordinator Station places contacts in the Target Queue for use by the players manning the Weapons Control and Torpedo Control Stations. If the Weapons Coordinator drops a contact from the Target Queue the track disappears from the Target Queue in all three stations. If the dropped track was assigned to a weapon, all references to the track are removed. The assignment is lost. If the track was assigned to a torpedo, the weapon is now assigned to the bearing of the dropped track instead of the track number.

## ***SUBMARINE MULTIPLAYER GAMEPLAY DIFFERENCES***

In Multiplayer or Multi-station games submarines have a few differences related to the Link. Submarines are frequently out of communication with the rest of Ownside. At the start of a mission no one in your Link knows where you are and you do not know where your Link participants are

located until you come to communications depth (comms depth) and raise your radio antenna.

While you can stream your floating wire and download the location of all surface and air Link participants and their contacts, they will not see you unless you come to comms depth and raise your radio antenna. See *Appendix C: Submarine Max & Mins* for comms depth information for all controllable submarine classes. Other Ownside submarines in the mission are not seen in your Link data unless they are at comms depth with their radio antenna extended at the same time you are receiving Link data. You must be at comms depth with your radio mast extended to promote a contact to the Link.

## MULTI-STATION DIFFERENCES

In addition to the differences mentioned above, several other differences are encountered in a Multi-Station game. These are noted below.

**Task Bar Maneuver Shortcuts:** In Multi-Station, course, altitude/depth changes and speed changes in the Task Bar can only be entered by the player controlling the Pilot, Ship Control or Bridge Station.

**Task Bar Orders Menu:** Orders Menu Shortcuts are only available to the player assigned to the applicable station.

**Task Bar Stations Menu:** Station Icons for stations not assigned to a player are unavailable to that player.

**Nav Map Ownship Menu:** Ownship Menu shortcuts are only available to the player responsible for that functionality.

**Keyboard Function Keys:** Functions keys for accessing stations not assigned to a player are disabled.

**Voice Commands:** Only voice commands applicable to a player's assigned stations are functional.

---

## MULTIPLAYER WARNING AND ERROR MESSAGES

It is possible for experienced players to customize *S.C.S. – Dangerous Waters* database, doctrine, interface and scenario files. Since it is imperative all players in a multiplayer game share the same version of certain files, you may occasionally receive warning and error messages. These messages inform all players when specific files differ from the host's file. Anyone running a different version of *S.C.S. - Dangerous Waters* is informed their version does not match that of the host.

Listed below are the messages most likely to occur, an explanation of why the message was received, and a suggestion for remedying the situation. These messages do not prevent the named client from joining the game.

- ✓ **Note:** The Host may want to refuse players who refuse to play with the same files as the host. Files altered by an experienced player can give that player amazing advantages!

**MESSAGE:** “Error—This client has different databases than the host.”

**EXPLANATION:** This error appears when one or more of the client’s database files are different from the same files on the host’s computer. All other players receive the text as a chat message that follows the name of the player whose files are different.

**REMEDY:** The client should copy the database files from the host player. The database files are located in the Database directory where *S.C.S. - Dangerous Waters* is installed. The client may want to make a copy of his original files before replacing them with the host’s files.

**MESSAGE:** “Warning—This client has different doctrine files than the host.”

**EXPLANATION:** This warning alerts all players when the doctrine files of the host and the named client are different. All other players receive the text as a chat message that follows the name of the player whose doctrine files are different. The message alerts players that either the host or the named client may have an unfair advantage over those players who have not modified their doctrine.

**REMEDY:** The client should copy the host’s doctrine files. The doctrine files are located in the Doctrines directory where *S.C.S. - Dangerous Waters* is installed. The client may want to make a copy of his original files before replacing them with the host’s files.

**MESSAGE:** “This client is running a different language version than the host.”

**EXPLANATION:** This message appears on the client’s lobby screen when selecting a host. This is an informational message and may explain scenario difference messages later.

**REMEDY:** N/A

**MESSAGE:** “Client interface files are different than the host’s files.”

**EXPLANATION:** This warning alerts all players when the interface files of the host and the named client are different. The message alerts players that either the host or the named client may have an unfair advantage over those players who have not modified their interface files.

**REMEDY:** The client should copy the host’s Interface files. The Interface files are located in the Interfaces directory where *S.C.S. - Dangerous Waters* is installed. The client may want to make a copy of his original interfaces files before replacing them with the host’s files.

**MESSAGE:** “Warning—Requested scenario is different possibly due to language differences between client and host.”

**EXPLANATION:** This message appears on the client’s screen when the host selects a mission and the client’s scenario file for the selected game is

different than the same file on the host's computer. A chat message is also sent to all connected players to inform them of this discrepancy. This message will only appear if the client's *S.C.S. - Dangerous Waters* is running a different language than the host *and* the scenario is different.

**REMEDY:** The client can copy the host's scenario file or the game can be continued as normal. The host can decide whether this is a trusted client using a different language scenario file.

**MESSAGE:** "Error: Your game dropped multiplayer messages!"

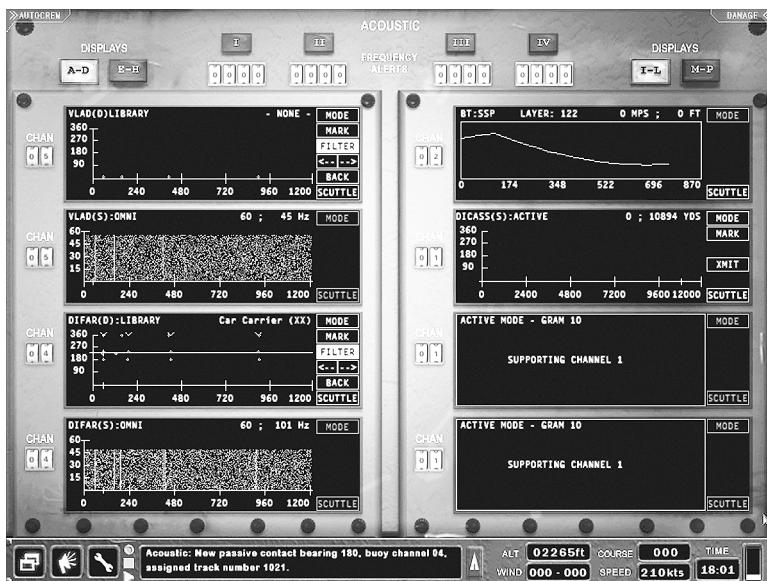
**EXPLANATION:** This message appears as an incoming Chat message in the rare event that your computer is running too slow to keep up with incoming multiplayer messages. When this occurs the state of entities in the game may appear different on different computers and ships could head off in different directions.

**REMEDY:** Ensure that no other programs are running at the same time as *S.C.S. - Dangerous Waters*. Also, ensure that no other programs are sharing the Internet connection or slowing it down for some reason.



# SECTION 5

# TRAINING



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## 5: TRAINING

This section contains information needed to successfully complete some S.C.S. - *Dangerous Waters* game tasks. To effectively use the various stations you encounter in the game it is helpful to have some background and general information about why you need various stations and what happens there.

---

### SONAR SCHOOL

Subs, ships and aircraft all use Sound Navigation And Ranging (Sonar) to detect submarines, although sonar also detects surface ships in the area. All controllable platforms in *Dangerous Waters* have some form of sonar capability. These are described later in this section.

#### SONAR

A sonar array is an interconnected group of hydrophones or transducers that focus either the transmission or reception of sound. There are two types of sonar: **passive** and **active**. Each has an important place in anti-submarine warfare.

#### Passive Sonar

A passive sonar system can only listen. A hydrophone (sensor) or a set of hydrophones is positioned to receive sounds produced by sources in the water. Its major purpose in this game is to detect and help classify submarines and ships. Depending on environmental conditions passive sonar can detect contacts several miles away; however, you can only determine the direction, or bearing, of the contact. The distance, or range, to the contact is not immediately known. It is helpful to know the range to successfully target the contact.

By tracking a contact over time with passive sonar you can fairly accurately determine a contact's bearing, range, course, and speed by using a process called Target Motion Analysis (TMA). See *Training/TMA Basics*.

#### Active Sonar

An active sonar system transmits a high-energy acoustic signal or "ping". Any object in the area reflects the transmitted signal and the sonar sensors pick up the returning echo. The time from the initial transmission to the reception of the echo accurately reveals the range to the contact and the direction of the returning echo indicates the bearing.

Active sonar quickly provides range information but the active transmission can also be received by enemy ships and used to locate the transmitting sensor. Because of this risk submarines should use active sonar only as a last resort for determining a target's range. Using TMA on passive sonar contacts is a safer approach to localization when time permits.

**Tip:** When commanding an aircraft do not use sonobuoys in active mode unless you are very sure where the submarine is. The submarine can detect active sonobuoys outside active detection range and evade.

## High Frequency Active Sonar

High Frequency Active Sonar (HFAS) is usually a separate system from the lower frequency “active sonar” that is a part of the platform’s integrated sonar suite. It produces higher frequency transmissions that have shorter wavelengths than those of medium frequency (MF) active sonars. These transmissions provide excellent bearing and range resolution for contacts in the vicinity of Ownship. HFAS does not have the range of MF active sonar and also is less likely to be counter detected at longer ranges because HF sound is absorbed more quickly than lower frequency transmissions.

Because of its high resolution, HFAS is the sensor of choice for traversing minefields or navigating under the ice when commanding a submarine with that capability. It also can be used for rapid localization (range and bearing) of a close-in contact when counter detection is no longer a consideration, as when coming to periscope depth noncovertly or when a quick firing solution is needed for a close aboard enemy.

As modeled in *S.C.S. - Dangerous Waters*, the HFAS marks all contacts it detects at one time, placing a HF Sonar marker on the Nav Map at the location of each return. Additionally, the active returns display an outline of the detected object on the High Frequency Active Sonar display, providing a visual image of the detected object. A HFAS contact is not assigned a track number and consists only of a marker placed at the location of the first detection. To update the location, delete the current marker and mark the contacts again. Marking contacts in HFAS is described below:

**FFG:** In the Hull Sonar Station [F4] click ACTIVE mode then click High Frequency. Click BACK to access the MARK button. Click on a contact on the display and then click MARK.

**Kilo:** In the Periscope Station [F8] click the screen transition button at the top of the screen to access the High Frequency Sonar console. Contacts appear in red. Click the display once to mark all currently detected contacts.

**Akula:** In the Periscope Station [F8] click the Under Ice/High Frequency button. In the High Frequency console, ensure that FORWARD LOOKING is selected for mine detection. Select UPWARD LOOKING to find a polynya during under ice operations. Click the display once to mark all currently detected contacts.

**Seawolf:** In the Sonar Suite [F2] click the ACTIVE Sonar icon button. Click FREQUENCY in the matrix button panel. Click HIGH and then click BACK. Contacts appear as orange dots or an outline depending on the range to the contact. Click on a contact in the display then click MARK.

**688(I):** In the Ship Control Station [F1] click the toggle switch to the ON position on the High Frequency Display in the center of the screen. Click the display once to mark all currently detected contacts.

## ACOUSTIC SIGNALS

Passive sonar is used to detect and determine the location of the sources of acoustic energy, or sound, in the water. The ocean has numerous sources of acoustic energy including seismic events, biologics such as whales and shrimp, and waves, as well as noise generated by ships and submarines.

The sound that is ever present in the water and doesn't appear to come from a specific contact is known as **background** or **ambient noise**. Ships, subs and other acoustic contacts emit energy, or signals, that stand out against this backdrop of ambient noise when processed by a sonar system.

Detection ranges for sonar arrays are influenced by the strength of the signal being detected and the amount of background noise interference between the contact and the sensor. This is called the **Signal To Noise Ratio (SNR)**. Directional sonar increases SNR by focusing the sonar beam into a smaller area pointed at the target.

### **Signal Strength**

The amount of noise a contact generates is known as its signal strength. Depending on the sonar display, a signal appears as a line, a spike, or a dot. Thick lines, tall spikes and larger, darker dots indicate stronger signals. The signal strength generated by a contact is influenced by the type of contact it is (loud merchant ship or quiet diesel sub), its range and its speed.

In general loud, fast contacts generate a strong signal while quiet contacts generate a faint signal. Distant contacts can be faint while close contacts are stronger. However, a faint signal doesn't always mean a distant contact. It could be a quiet submarine close by traveling at a slow rate of speed while a strong signal could be a merchant ship at a greater distance traveling at a high rate of speed.

### **Noise**

The amount of noise detected by your sonar sensors is influenced by the speed of your Ownship as well as several environmental factors. The noise generated by Ownship's movement through the water increases as your speed increases. The more noise you generate the less your sensors can detect. It is possible that all signals can be lost in the noise if you travel fast enough.

The wave action of a high sea state also generates background noise that can influence signal detection. Thermal layers, discussed later in this section, can significantly reduce the ability of signals to travel through the water.

### **Broadband Signals**

Sonar systems detect acoustic signals in the **broadband** and **narrowband** frequency ranges. Contacts of interest emit both broadband and narrowband signals.

Passive broadband (PBB) acoustic sources, which can be generated by a ship's movement through the water and its propeller and shaft, emit acoustic energy over a wide range of frequencies. The broadband display shows all contacts that emit acoustic energy that fall within the broadband range. A broadband sonar receiver is used primarily to detect and track contacts for TMA and also can contribute to classification through both DEMON and aural analysis.

### **Narrowband Signals**

Passive narrowband (PNB) sources emit energy at a distinct frequency. A narrowband acoustic source is typically generated by a specific piece of equipment on a ship such as a pump or a motor. Because it is possible to detect a contact at a longer range by searching for a distinct frequency it is sometimes helpful to start the search for contacts in narrowband sonar. The increased detections are possible because narrowband focuses the sonar in frequency, rejecting ambient noise that is outside the frequency band of the target signature.

Additionally, the specific frequencies emitted by a contact are unique and readily identifiable; therefore, narrowband frequencies can be used to classify contacts. The specific frequencies associated with a ship are known as its **sonar signature**, sometimes called its **sound profile**. Sonar systems access a library of known sonar signatures or profiles to aid in the classification process.

Contacts can be classified in each submarine's Sonar Narrowband Station, and in the Acoustic Station on the FFG, P-3C and the MH-60R platforms. The MH-60's dipping sonar in passive mode can also be used to classify contacts.

---

**Tip:** Use Narrowband sonar for detection and classification of contacts.

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## **UNDERWATER SOUND PROPAGATION**

Sound travels in waves of alternating high and low pressure created when a vibrating object disturbs the air or water around it. While sound in air generally travels in a straight line until it is reflected or simply fades away, sound in water tends to bend depending on conditions in the water it is traversing.

The speed of sound in the ocean is related to temperature, salinity, and depth. Salinity usually does not change for a given ocean area. Increasing depth or increasing temperature tends to increase the speed of sound. Temperature may increase or decrease with depth near the surface, depending upon atmospheric conditions, but eventually begins to decrease until a depth of about 3000 feet, where it becomes nearly constant (isothermal). While the temperature is decreasing with depth, the speed of sound will also decrease unless the change in temperature is very small. But at deep depths, the speed of sound increases with depth.

In the ocean, acoustic energy travels along paths that are determined by changes in the speed of sound through the water. Sound waves are refracted (bent) away from a region where the speed of sound is increasing.

## **Thermal Layers**

Sometimes conditions in the ocean give rise to an effect known as the **layer**. As the surface of the ocean cools late in the day, a region of increasing temperature near the surface creates a layer where the temperature increases with depth. At the layer depth the normal cooling with increased depth resumes, so that the layer depth is the depth with the greatest temperature. Sound energy bends away from the layer, so that a contact is much harder to detect if it is on the opposite side of the layer depth from the sonar array. Very little sound energy passes through this layer depth, especially at higher frequencies.

## **Sound Speed Profile (SSP)**

Locating a thermal layer in your area of operation can help you to avoid detection or even an incoming torpedo if you are in a sub. If you are in a ship or aircraft, knowing the depth of the layer can also alert you to the need to adjust the depth setting of sonobuoys to detect a contact that might be lurking on the other side of the layer. A Sound Speed Profile (SSP) is a useful tool in determining the location of a thermal layer in your area of operation. The SSP contains a graph (and in the subs also a table) depicting the speed of sound at different depths. The profile is generated from information provided by an **Expendable Bathythermograph (XBT or BT)** probe.

There are three types of ocean environments modeled in *Dangerous Waters*: Bottom Limited, Surface Duct and Convergence Zone.

### **Bottom Limited**

In a bottom limited ocean environment, the water depth is not great enough for the isothermal region to be present. Instead, the temperature decreases with depth all the way to the bottom. This means that sound waves are bent toward the bottom, and any sound detected beyond direct path range will have one or more bottom bounces, losing energy with each bottom bounce. In addition, background noise is high since the surface noise bounces off the shallow ocean floor and propagates for some distance.

- ✓ **Note:** If a mission designer designates the area as bottom limited there will be no layer in the mission regardless of the depth of the ocean in the area. Surface Duct is the default environment for user-generated missions in the S.C.S. - *Dangerous Waters* Mission Editor.

### **Surface Duct**

Sound speed increases down to the thermal layer in a surface duct, then decreases to the bottom. While detection ranges are roughly the same

above and below the layer, detection ranges are cut roughly in half across the layer.

## Convergence Zone

In some deep ocean environments, the bending of sound energy results in rings around a sound source where the sound rays are focused, so that the propagation loss is reduced by large amounts. These areas are called convergence zones (CZ), and when present, occur at intervals of 20 to 35 nm depending upon surface temperature. The CZ width is typically 5 to 10 % of the CZ range. Between the convergence zones, bottom paths usually prevail, so that contact is not maintained for any but the loudest contacts. This results in a characteristic condition where a contact will be held at a high SNR while in the CZ and then lost for 30 minutes or more before appearing as a direct path contact – or possibly not being detected until it has passed the closest point of approach and is again in the CZ as an opening contact.

## Generating a Sound Speed Profile (SSP)

The FFG-7 and controllable aircraft deploy Bathythermograph Sonobuoys called simply BT sonobuoys. Once the buoy hits the water it deploys a probe that descends at a constant rate and transmits the sound speed data it collects to the deploying ship or aircraft. BT sonobuoys are launched in the same manner as all other sonobuoys.

XBT probes are launched from submarines somewhat like a countermeasure. The probe rises to the surface before it begins to drop at a constant rate and starts returning data. If the sub is deep it may be some time before data begins to appear. The temperature data gathered by the XBT probe is transmitted to the sub where the returning data is plotted at Sonar SSP station.

### To launch a BT Sonobuoy in S.C.S. – *Dangerous Waters*:

**FFG-7:** BT sonobuoys are launched from the **ASTAC Station**.

**MH-60R:** Sonobuoys are launched from the **ATO Station**.

**P-3 C Orion:** Sonobuoys are launched from the **TACCO/Sonobuoy station**.

- In the above platforms the SSP graph appears in a Sonobuoy Display Window (gram) in the Acoustic Station once you tune to the channel receiving data from the BT sonobuoy. The depth of the layer appears in the top line of the display following the LAYER label.

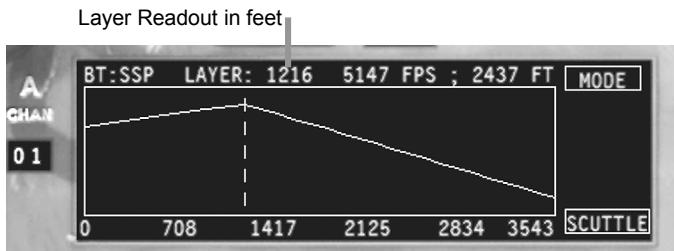
---

**Tip:** To determine the channel number for a specific sonobuoy, visit the Nav Map. The channel number for a buoy is noted beside its NTDS symbol on the Nav Map and is shown in the DDI when a buoy symbol is selected.

---

Below is a view of a Sound Speed Profile from a BT sonobuoy launched by a MH-60R and processed by the FFG with the location of the layer identified. In S.C.S. *Dangerous Waters* the SSP depth data displays in feet

on the horizontal (X) axis. In the subs, depth data displays on the vertical axis in feet.



**To Launch an XBT from a Sub:** XBTs are launched from the Sonar Suite's SSP Station.

- The Sound Speed Profile displays in graph and table form at the SSP station.

### **Utilizing Thermal Layers**

Understanding the effects of thermal layers on sound propagation is very important when using sonar or attempting to limit sonar detection of ownship. Since sound waves bend away from the layer, it acts as a screen to shield your sub from sonar on the other side of the layer. This bending also lessens the ability of *your* sonar to *detect* a contact on the other side of the layer. When commanding a submarine it is wise to stay below the thermal layer to avoid detection by surface ships or submarines operating above the layer. If an enemy sub is also below the layer it may be prudent to move above the thermal layer to decrease the likelihood of being detected. There are no clear-cut rules for utilizing the layer since how you use the layer depends on whether you hope to remain undetected or maximize your sonar range.

When commanding the FFG or an aircraft it is important to know the location of the layer so you can set your sonobuoys to the correct depth to optimize the probability of detecting a submarine.

## **SONAR SYSTEMS**

Every controllable platform has at least one sonar or sonobuoy system. Trackers available on the FFG's and submarine sonar systems work directly with the Target Motion Analysis and Fire Control systems to help assure accurate localization and targeting data.

Sonobuoy systems both in passive and active mode are used to determine the location of subsurface contacts using a process called triangulation.

---

**Tip:** To determine the location of a contact in S.C.S. - *Dangerous Water*, view the intersection of the lines of bearing from three sonobuoys on the Nav Map. The intersection fairly accurately pinpoints the location of the contact. The depth of the contact is still unknown.

---

Each sonar system or array has a specific alphanumeric designation or name. However, an array is frequently referred to by its shape or location on the platform.

## **Towed Arrays**

A **towed array** is a linear array dragged behind a ship or sub. It is a passive sonar system used by both submarines and surface ships.

**FFG-7:** The FFG-7 utilizes the AN/SQR-19 Tactical Towed Array Sonar System (TACTASS) for broadband and narrowband detection and tracking. In the case of the FFG-7 the array is towed a mile behind the ship, thus, the ship does not interfere with the array's ability to search any part of the environment (masking.) TACTASS provides full 360° detection.

**Subs:** The number of towed arrays and their capabilities vary from sub to sub.

Towed arrays are for both broadband and narrowband detection and tracking in the subs. They are used at low to medium speeds and optimized for lower frequencies.

Because a sub masks a certain amount of the environment from a sub-mounted or towed array no individual sub-mounted sensor provides full 360° detection. Together the subs' arrays provide omni-directional detection capabilities

✓ **Note:** No towed array is modeled for Kilos in *Dangerous Waters*.

## **Surface Ship Hull Sonar**

The FFG-7 is equipped with the SQS-56 active-passive hull sonar. Located at the bow of the ship this sonar is primarily used in active mode since its passive sonar capability is limited. Passive mode supports detection of broadband contacts and has no narrowband capability.

## **Submarine Spherical/Cylindrical Bow Arrays**

Arrays housed in the bow of a submarine are usually spherical or cylindrical in shape. These bow arrays can track broadband as well as narrowband contacts.

At higher speeds, there is some degradation of performance because of flow noise caused by the water moving across the surface of the array. The bow array is not as sensitive to low frequencies, so it's not the array of choice for low frequency, narrowband contacts.

## **Submarine Hull/Conformal Arrays**

The hull/conformal array, also near the bow of the ship is a linear array conforming to the shape of the hull. It provides low speed capability to detect low frequency narrowband contacts). As such, its primary use is for classifying targets.

## Submarine Flank Arrays

A flank array is a flat rectangular panel on the side of the sub.

**Seawolf Wide Aperture Array (WAA):** The WAA consists of three flank arrays on each side of the Seawolf class submarines. In S.C.S. - *Dangerous Waters* the Seawolf's WAA can provide rapid passive localization (RAPLOC) for sonar contacts within a 15 kyd range. See *Seawolf Stations/Seawolf Sonar Suite/Seawolf Broadband Station* for information on how to use the WAA to determine the range of a contact.

**Kilo:** Some Kilos carry the MG-53 passive sonar set. There is some thought that this may be a flank array while others believe it is an active intercept set.

- ✓ **Note:** For gameplay purposes a passive sonar flank array and active intercept are modeled for the Kilos in S.C.S. - *Dangerous Waters*.

## Sonobuoys

Sonobuoys are part of an acoustic system used by naval forces to detect, localize and classify hostile submarines. Some sonobuoys are used to determine specialized information regarding environmental conditions in an area of interest.

Sonobuoys can be dropped into the ocean by ASW aircraft and also “over the side” (OTS) by ships. The sonobuoy deploys a floating transmission unit and its hydrophone array descends to a preset depth on a cable.

- ✓ **Note:** The sonobuoy cylinder is discarded when the contents are deployed and drops to the bottom. In the game the 3D sonobuoy object is depicted as a floating cylinder in the water making it easier to find the 3D object in 3D View.

When the sonobuoy's submerged sensors detect acoustic energy in the water the information is sent up the cable to the buoy's radio transmitter. The monitoring platform receives the transmitted data and it is processed, analyzed and recorded for further analysis or replay.

In the game sonobuoys dropped by any controllable platform have a life span of two hours and can be scuttled by the player at any time while the receiver is tuned to the transmitting channel.

Sonobuoys can be **active, passive or special purpose**. Within those types several modes may be available. All three types are modeled in S.C.S. - *Dangerous Waters*.

- ✓ **Note:** In S.C.S. - *Dangerous Waters* when a contact detected by a buoy in passive mode is marked, a white line appears on the Nav Map and extends from the buoy along the line of bearing where the contact is detected. Contacts marked in passive mode result in LOB ending with a symbol for an unknown category/unknown alliance at

the default range of 10 nm from the buoy. Contacts marked by a buoy in active mode appear on the Nav Map at the end of a white LOB ending with the unknown/unknown symbol at the range reported by the active return.

## Passive Sonobuoys

Passive sonobuoys deploy **hydrophones** that listen for sound energy created by ships and submarines and report bearing and/or target signature information about the sound source. A passive sonobuoy buoy can have **directional** or **omni-directional** hydrophones or both.

**Omni-directional hydrophones** detect and relay information about a specific frequency band. They cannot determine the bearing to the contact; they only indicate that something is out there. Generally, omni-directional sonobuoys have a short detection range, so that detection indicates a nearby submarine.

**Directional hydrophones** provide a bearing to detected sound energy but not a range.

By dropping a pattern of directional sonobuoys the location of the sound source can be identified by a process called triangulation. In *S.C.S. - Dangerous Waters* the intersection of three or more sonobuoy LOBs can indicate the location of the sound source. The U.S. Navy's DIFAR, LOFAR and VLAD sonobuoys are examples of passive sonobuoys. All three are modeled in the game although LOFAR are not carried by the controllable platforms. DICASS can operate in Omni and Directional passive modes as well as in Active mode.

In *S.C.S. – Dangerous Waters* when a buoy is hot (detecting and transmitting information) the Nav Map symbol for the buoy has a red dot in the center.

---

**Tip:** Passive buoys should be used for the initial detection and classification of submarine contacts. This keeps the target sub 'in the dark' as to the presence of the deploying aircraft.

---

## Active Sonobuoys

Active buoys emit an acoustic ping into the water. By examining the return echo the exact range of the target can be established. Some active buoys return both bearing and range, some only range. Ships and aircraft in *S.C.S. - Dangerous Waters* carry the DICASS sonobuoy. As modeled, it returns both range and bearing to the contact.

Active sonobuoys are typically used a) to determine the location of a submarine contact when the ASW aircraft is in attack mode, b) when localization information is needed quickly, c) when environmental conditions make it difficult for passive buoys to collect the necessary data and/or d) when the contact is extremely quiet.

The U.S. Navy's DICASS Sonobuoy has an active mode and is modeled in *Dangerous Waters*. Additionally DICASS has both Omni and Directional passive modes.

## **Special Purpose Sonobuoys**

The Bathythermograph sonobuoy is used to measure the speed of sound through the water at various depths and temperatures and sends a reading of sound speed versus depth to the deploying unit. This information is useful in determining the location of thermal layers in the area of interest.

## **Sonobuoys in S.C.S. - Dangerous Waters**

In *S.C.S - Dangerous Waters* sonobuoys have the following properties.

**Lifespan:** 2 hours from the time of deployment.

- Buoys can be scuttled, or sunk, at any time by clicking the Scuttle VAB in the gram display when the Display Window is tuned to the transmitting channel.
- Depth:** All buoys (except BTs) are designated either "Deep" or "Shallow" when selected for launch.

**Shallow:** 90 feet

**Deep:** 400 feet

**Detection Range:** Whether or not a buoy detects a contact depends on target type, sensor and target depth, water depth, sea state, target speed, target aspect, bottom type, and other factors. Given the buoy sensitivities modeled in the game, the VLAD will generally detect contacts at a much greater range than a DICASS or DIFAR buoy,

As a point of reference, assuming the same environmental conditions, the DICASS might be expected to detect a contact at 3000 yards, while the VLAD will be able to detect it at 8,000 yards. The maximum detection range in passive mode for any buoy is approximately seven nautical miles.

**Transmitting Range:** Platforms within line of sight of buoys placed by Ownside can detect sonobuoy transmissions. For the FFG detection range is approximately 12 nautical miles. Aircraft detection ranges vary based on the aircraft's altitude.

The following sonobuoys are modeled in *S.C.S. - Dangerous Waters*:

### **DIFAR (Directional Frequency and Ranging) Sonobuoy**

**Sensors:** Four directional hydrophones and one omni-directional hydrophone

**Primary Use:** Search, detection and classification of submarines.

### **VLAD (Vertical Line Array Directional Frequency Analysis and Recording)**

**Sensor:** Directional passive sonar (Same as DIFAR) plus array of eight omni-directional hydrophones.

**Primary Use:** Signal detection in areas of high ambient noise.

**Tip:** When a high sea state increases the level of background noise, VLAD should be your buoy of choice.

### **LOFAR (Low Frequency Analysis and Recording) Sonobuoy:**

**Sensors:** Omni-directional hydrophone

**Primary Use:** Gathering data on ambient noise levels.

- ✓ **Note:** LOFAR buoys are not carried by controllable platforms in S.C.S. - *Dangerous Waters* but can be placed in scenarios by mission creators. They can be picked up by buoy processors and may appear in gameplay.

### **DICASS (Directional Command Activated Sonobuoy System)**

**Sensor:** Active sonar (Passive directional and omni-directional modes are possible)

**Primary Use:** Active mode provides range, bearing

### **BT (Bathythermograph) Sonobuoy**

**Sensor:** Thermistor temperature probe.

**Primary Use:** Determining the location of thermal layers.

**Tip:** As modeled in S.C.S. - *Dangerous Waters*, VLAD sonobuoys have a longer passive detection range than other sonobuoys modeled in the game. DICASS buoys have the shortest passive detection range but also have active sonar capability. Use VLADs to make initial detections and DIFAR to narrow the search. When you are certain there is a contact of interest in a specific area, use a DICASS buoy in active mode to pinpoint the target.

### **Sonobuoy Data Display Windows (Grams)**

The FFG-7, MH-60R and the P-3C all process sonobuoy data. In these platforms sonobuoy data are received in the Acoustic Station and display in CRT Display Windows. Sometimes these display windows are referred to collectively as grams, although technically that term usually applies to LOFAR gram data that displays in the window. In the game interfaces some sonobuoy display interfaces are labeled GRAMS regardless of the type of data displayed.

Sonobuoy data display windows (grams) default to Omni mode. A sonobuoy in Omni mode returns non-directional frequency data, and requires one display window. Directional mode, which returns received frequencies and bearings, requires two windows. Active (pinging) mode returns bearing and range data, and requires three windows.

- ⇒ To free other display windows for use by sonobuoys set to Directional or Active modes, set the required number of supporting windows to channel 00. Then change the mode in the active

channel to Directional or Active. (Turn Acoustic Autocrew OFF or he may change your channel selections.)

## Sonobuoy Data Display Window Functionality

In S.C.S. - *Dangerous Waters* a sonobuoy has a lifespan of two hours from the time of deployment. When the buoy is out of transmitting range or has lost its connection, a message displays in the gram window indicating that the connection has failed and NO DATA is being received on the selected channel. If the buoy has not timed-out, changing course could bring you back within range, particularly when in an aircraft.

- Buoys that are "hot" (detecting sound data) appear in the Nav Map with a red center. Buoy symbols disappear from the Nav Map and Geoplot when they have timed out.

The FFG Acoustic Station Display Windows are seen here. Their Variable Action Buttons are digital and contained within the Display Window. The Sonobuoy Display Windows for the P-3C are similar but have green text. In the MH-60R Acoustic Station, the text labels are the same but the push buttons that control the functionality are outside the display window next to the label.

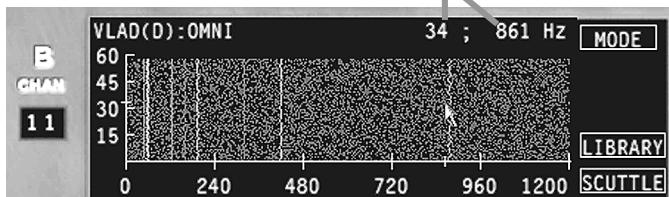
- ⇒ In the MH-60 click the button next to the desired text.
- ⇒ In the FFG and P-3 click the text of the desired digital button.
- In the FFG buttons rimmed in grey are disabled.
- In the P-3C buttons with no rim are disabled.

✓ **Note:** Setting a buoy display to Directional or Active mode requires supporting windows. Each platform is slightly different. In the case of the FGG, directional and Active modes can only be set in windows A-D. See the Acoustic Station section for the FFG, P-3C, and MH-60R for information on how each platform handles changing mode and freeing supporting windows.

**Omni Mode Display:** In Omni mode detected signals appear as lines in a 'waterfall' display moving from bottom to top above the number indicating the detected frequency. A sixty-second record is visible.

Time and Frequency at location of the cursor

Omni Mode



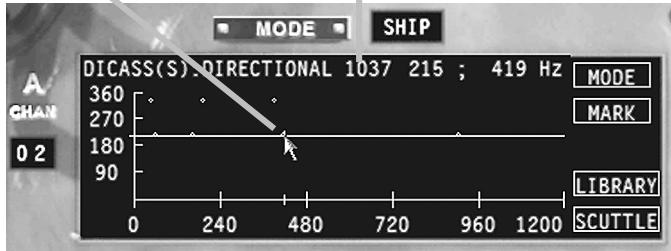
**Directional Mode Display:** Dots indicate detected frequencies on a specific bearing. The bearing-frequency cursor consists of a short vertical line on a horizontal bearing indicator. Click on a specific frequency dot to select it then click MARK. The track number assigned displays in the top

row. Selected frequencies can be marked but no trackers can be assigned to sonobuoy data. If a frequency is marked, the assigned Track Number appears when the cursor is held over the dot.

Bearing-Frequency Cursor

Track # of contact under cursor

### Directional Mode

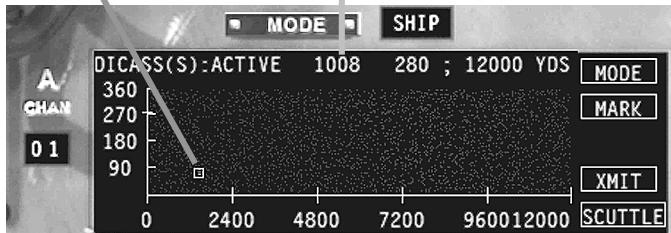


**Active Mode Display:** Once activated, the buoy transmits continuously. Returns fill in from left to right and contacts appear as bright spots in the noise background. Click on the contact to select it with the square cursor. (The cursor appears once the display is clicked.) Once a track number is assigned it displays in the top row when the contact is selected. Click XMIT to begin active transmissions.

Active Mode Selection Cursor

Track Number

### Active Mode



**BT Display:** The BT sonobuoy returns the speed at which sound travels at varying depths. This information pinpoints the depth of any thermal layer in the area. The layer depth appears in the LAYER: field in the top row. There is no alternate mode. The only user functionality is to scuttle the buoy.

## Sonobuoy Data Display Window Labels

**Top Line Readouts** (From left to right):

**Buoy Name:** DICASS, DIFAR, VLAD, LOFAR or BT

**Buoy Depth:** (D) = Deep; (S) = Shallow

**Buoy Sensor Mode:** Omni, Directional or Active; SSP

**Track Number:** When the selected contact or frequency is marked, the track number appears here.

## Cursor Location:

**Omni Mode:** Seconds; Frequency

**Directional Mode:** Degrees; Frequency

**Active Mode:** Degrees; Yards

**BT:** Sound Speed in Meters per second

## X /Y Axis

**Omni Mode:** Y: Time in seconds; X: Frequency

**Directional Mode:** Y: Degrees; X: Frequency

**Active Mode:** X: Degrees; Y: Yards

**BT:** X: Sound Speed (not labeled); Y: Depth

## Sonobuoy Data Display Window VABs

Variable Action Buttons (VABs) are present on the right side of all gram Data Display Windows.

In the FFG and P-3 these are digital buttons contained within the window itself.

In the MH-60R these are “push buttons” on the right side of a label. When a buoy is in Active mode on the MH-60R, the XMIT Button appears on the left side of the gram. The Library VAB set includes Filter and Arrow buttons on the left side of the display window.

The following button labels are seen in all Sonobuoy Display Windows.

**MODE:** Click to cycle through available modes. If there are insufficient empty windows to support Directional or Active mode, the mode cannot be changed. Directional mode requires one empty window. Active mode requires two empty windows. (Empty=Set to channel 00.)

- When ON, Autocrew sets displays to Omni and Directional Mode only.
- Mode is disabled when there are no alternative modes and when the gram window is supporting Directional or Active mode.

**SCUTTLE:** Click to scuttle the buoy. The buoy no longer transmits and its symbol is removed from the Nav Map. Clicking Scuttle in a window supporting a buoy in Active or Directional mode scuttles the buoy it is supporting.

## Omni and Directional Mode VABS

In addition to Mode and Scuttle the following VABs are available for Omni and Directional modes:

**LIBRARY:** Click to access the ship’s sound signature profile database. See *Classifying a Contact with the Acoustic Library* later in this section. The following button set is revealed when LIBRARY is clicked.

- When a display window is in OMNI mode while supporting a channel in Directional mode, the Library button is not available.

**MARK:** (Directional mode only) Click on a contact to select it then click MARK to assign a track number and reports a line of bearing to the Nav Map and TMA.

**FILTER:** Click to filter out all but the most likely library profile matches. Button or label is illuminated when ON.

**BACK:** Click to return to the previous VAB set.

**Arrows:** Click the right and left facing arrow buttons to cycle through the available sound profiles.

### Active Mode VABs

In addition to Mode and Scuttle, the following VABs are available when Active mode is selected.

**MARK:** When the buoy is actively transmitting, click a detected contact to select it then click MARK to assign a track number and send bearing and range data to the Nav Map and TMA.

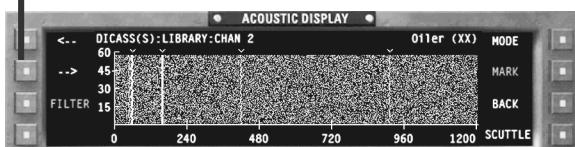
**XMIT:** Click to start active transmission. Once activated the buoy continues to ping at a set interval. There is no need to click XMIT again.

### Classifying a Contact with The Acoustic Library

The library provides a means to compare the detected frequency profile in the waterfall display with recorded profiles of a variety of ship classes and weapons. The Library is available in Omni and Directional modes.

- ⇒ Click LIBRARY to display the Library VAB set. Click BACK to close the Library.

Click to cycle the library profiles



The CLASS name of the selected library profile appears in place of the cursor data in the top line of the display.

The frequencies that make up the selected Library profile are represented by V-shaped Profile Frequency Indicators above the waterfall at the location of the frequencies that make up the sound profile of the ship or weapon named in the selected profile.

- ⇒ Filter OFF: Click the left or right facing arrows to click through all of the profiles in the database.
- ⇒ Filter ON: Click the left or facing arrows to view the profiles that most closely match the detected profile. When four or more lines (Omni mode) or dots (Directional mode) are visible, the list is narrowed to one or a very few options.

**Omni Mode:** When the profile frequency indicators line up closely with the signals in the waterfall it is a good indication that the contact might be that of the class indicated in the top row.

Contacts cannot be marked in OMNI mode. No information is available on the contacts' location, only that it is out there and an educated guess as to what it is. If you have marked many contacts on the Nav Map, you may not immediately know to which contact you should apply the classification determined in the Omni Mode Library.

- ⇒ When a good match between the detected profile and the library profile is found, take note of the class or weapon name in the top line and use that information to classify the contact using the right-click Contact Menu from the Nav Map when you have determined the contact to which the classification belongs.

**Directional Mode:** Dots indicate frequencies detected on a specific bearing. When at least four dots are present on a specific bearing, click on a dot to select the contact on that bearing. The name of a class in the LIBRARY appears on the top row. There may be other classes that are similar to the detected frequency profile in the Library profiles available for viewing.

1. Turn on the Filter if it is not on.
2. Click the left and right-facing arrow buttons to cycle through the available classes in the profile library.
3. Click on a dot in the display then click MARK to apply the selected class to the contact. The classification then appears in the DDI when the track is selected on the Nav Map or Geoplot.

### **Dipping Sonar**

Dipping sonar is a hydrophone lowered on a cable into the water from a helicopter. A hydraulic winch is used to raise and lower the sensor to varying depths. The helicopter can hover over a specific area of interest keeping a passive or active sensor at a relatively precise location. The helicopter must maintain a low altitude and speed to ensure that the sensor reaches the desired depth and that the sensor is not damaged or lost. (An altitude of fifty feet and a speed of zero are recommended.) See *MH-60R Stations/Dipping Sonar Station* for complete instructions on using this feature in *S.C.S. - Dangerous Waters*.

## **CAVITATION IN SUBMARINES**

Submarines experience a noisy event known as cavitation when their propellers move so fast that low pressure bubbles form and collapse in the water around the propeller. Your sub's speed and depth influence the occurrence of this phenomenon. In general, increasing speed tends to increase the likelihood and strength of cavitation, while going deeper reduces the likelihood.

When at all possible, avoid cavitation. The resulting noise alerts the enemy to your presence and can pinpoint your bearing. Your crew alerts you to the

fact that the ship's propellers are cavitating. When near the surface, lower your speed to reduce the possibility of cavitation.

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## TMA BASICS

This section provides an overview of the principles behind Target Motion Analysis (TMA). It explains what it is, a bit about how it works and what you do with the information gathered in TMA. The FFG-7 and all submarines in S.C.S. - *Dangerous Waters* have TMA capabilities. Information on how to use TMA within a specific platform is found in that platform's Stations section in the TMA sub-section.

- ✓ **Note:** To use the TMA station effectively a basic understanding of the TMA functionality found here is imperative.

### WHAT IS TMA?

At the TMA station, bearing returns from your ship's sensors are manipulated and analyzed to determine a contact's bearing, range, course and speed. This information, called a target solution, a firing solution or simply the solution, is necessary to accurately target a contact with your ship's weapons.

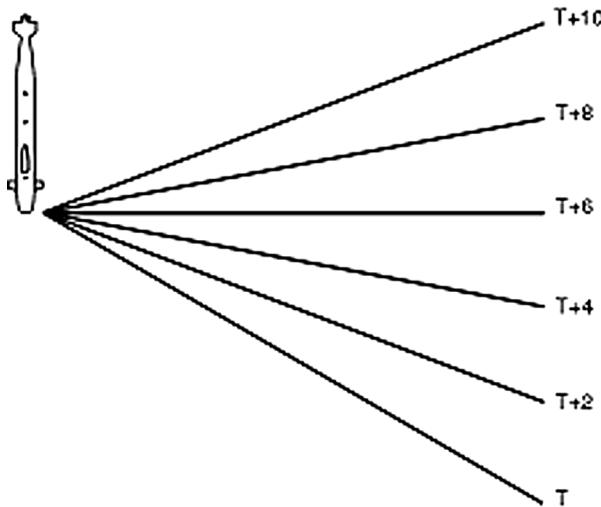
The contact designation number for each contact detected and marked by you or your Autocrew appears in a drop-down list at the TMA station. Selecting a contact designation from the list displays a history of the reported lines of bearing (LOB) to that contact on the TMA Board (Subs) or TMA DRT Plot (FFG).

### HOW DOES TMA WORK?

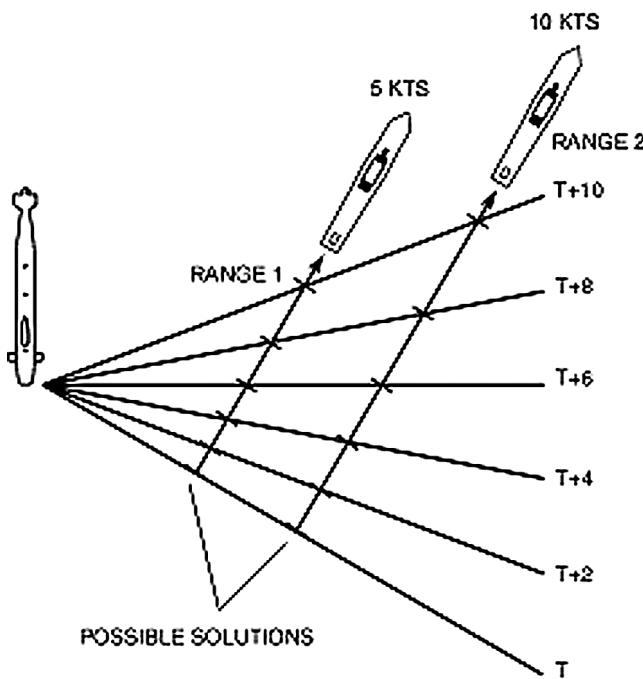
Target Motion Analysis is a process by which a contact's course and range are estimated using timed bearing readings and an estimate of the target's speed. At the TMA Station you examine available sensor data on a contact and develop possible or trial solutions.

While the examples shown here refer to submarines, the principles are the same for surface ships.

Suppose your ship is stationary and one of your passive sonar sensors is tracking an unknown contact. If at two-minute intervals you could draw a line from your ship along the bearing at which the contact is detected, it would look something like the diagram below.



When using passive sonar, the exact range of the contact is not known. Several solutions for the target might match this bearing fan. For example, the contact could be close to you moving at 5 kts or twice as far from you and moving at 10 kts. If you know the speed at which the contact is traveling, its range and course can be estimated.

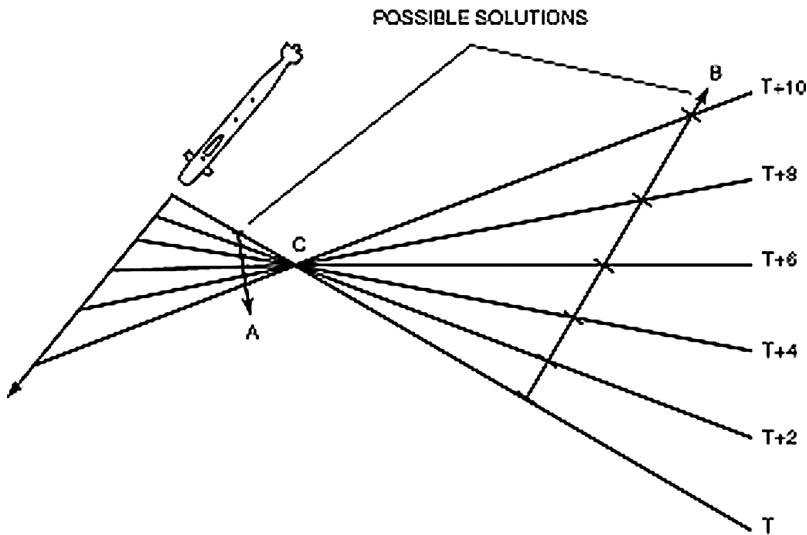


A new factor influences the **bearing rate** (change in bearing over time) when your ship is moving as well. However, the principle remains the same.

A concept that many commanders find helpful is that of lead and lag courses (legs) for Ownship. A **lead course** is one where Ownship's course and the target's course are on the same side of the line of bearing. With a **lag course**, the target's course and Ownship's course are on opposite sides of the line of bearing. In the drawing below, Ownship has a lead course on possible solution A and a lag course on possible solution B.

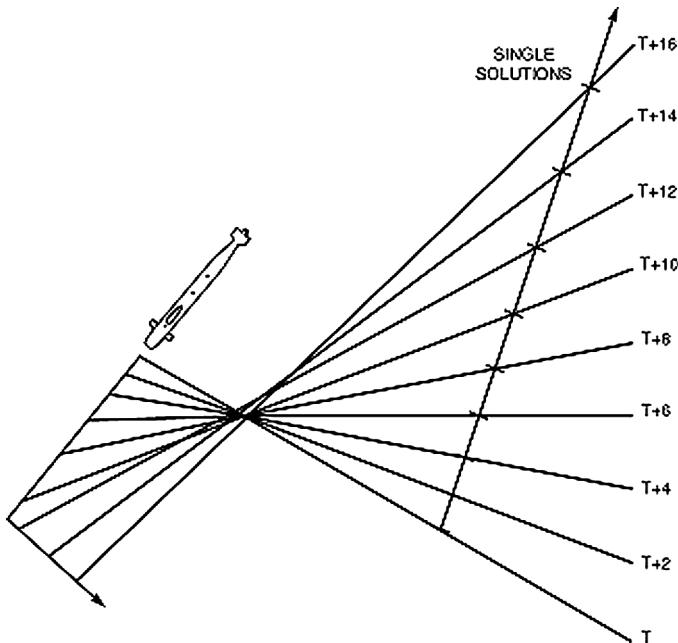
Point C where the lines of bearing cross indicates the maximum range for lead course contact A and a minimum range for lag course contact B.

As you can see in the drawing, you cannot initially be sure whether you are leading or lagging a contact. You can determine this after you turn your ship to a course on the opposite side of the line of bearing.



By changing your ship's contribution to the bearing rate you can mathematically reduce the number of possible solutions for the available data. You do this by changing the course and/or speed of your ship. The more you change your ship's contribution to the bearing rate, the more dramatic the change in the data. In most cases the leg with the larger bearing rate indicates a lag course. For a broadband contact, this may be easier to see on the sonar waterfall display.

If the contact maintains its course and speed and the sonar bearings are very accurate (they may not be for weak contacts), two or three Ownship maneuvers, or legs, will result in a single possible solution if the maneuver produces a moderate change in bearing rate. If large changes in own ship's speed across the line of bearing produce only a small change in bearing rate, then the contact is likely distant.



Use all available information when creating your trial solutions. If an intelligence message informs you the contact is on a specific course, enter that value in the Course trial solution field and lock that field. Knowing a second value, such as speed, eliminates a large number of possible target solutions. Once a contact is classified, determine its speed using the DEMON function in Sonar. See the *Stations/Sonar/Demon* section of the manual for the desired platform for information on using the DEMON interface.

## TMA TOOLS

The TMA tools are the same in all classes of controllable submarines in *SCS-Dangerous Waters*. The FFG's TMA tools are visually and functionally different but the principles of TMA remain the same. The tools are described here.

### **Submarines TMA Tools**

The TMA Station in submarines consists of a TMA board, a ruler, also known as a speed strip, trial solution fields used for entering possible or trial solution elements (bearing, range, course, and speed) and a means for entering a firing solution to the Fire Control System. The TMA stations in the submarines also contain a dot stack that the FFG-7 does not have.

### **FFG TMA Tools**

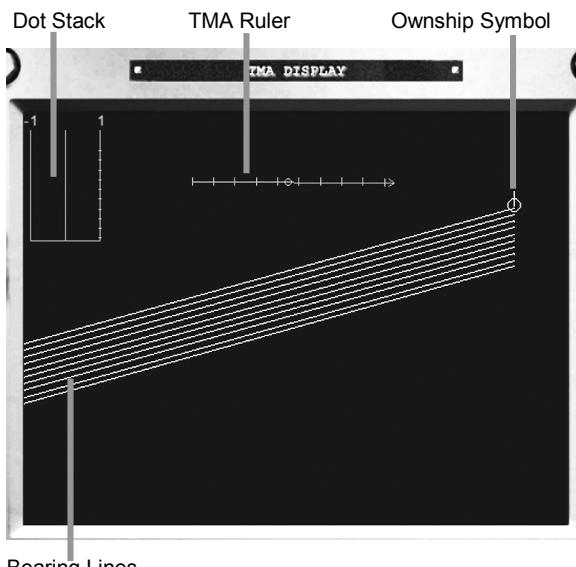
The FFG's TMA Plot resembles a Dead Reckoning Tracer (DRT). The TMA Plot appears as a large sheet of paper, a set of rulers indicating various

speeds, Ownship Indicator light, a TRACK UPDATE REPORT notebook used for entering trial solutions elements (bearing, range, course, and speed), and a means for entering a firing solution.

- ✓ **Note:** This training portion of the manual deals primarily with the Submarine TMA since all of them work the same way. The FFG's TMA Station functions a little differently. See *FFG Stations/FFG TMA Station* for information on using the FFG's unique TMA. However, FFG commanders should read this entire TMA training section to learn the basics.

### ***The TMA Display Board (Subs)***

The sub's TMA Display Board is located in the upper left area of the TMA Station. The board displays a representation of Ownship, a history of bearing data for a selected contact, a TMA ruler and an error dot stack. These tools are used to analyze sensor inputs. The Akula's TMA board components are seen and described below.



Bearing Lines

When a contact is selected from the track selection drop-down list, the most recent sensor information for that contact is displayed on the TMA Board. The information consists of a line of bearing extending from a point representing Ownship's position at the time of the report. If a tracker is assigned to the contact, every two minutes the latest line of bearing is added to the board. Over time these lines provide a history of bearing changes that provides valuable information.

Dragging and positioning the ruler across the lines of bearing allows you to test out possible solutions. The dot stack in the subs provides a visual cue as to the accuracy of your trial solution. The oldest bearing lines are deleted

after a set amount of time. (In the subs right-click on the TMA board to set the level of time history desired: 10, 20, 60 minutes or 4 hours) The tools used on the TMA board and the specifics of this process are described below. Learning TMA is not easy. If necessary, pause the game while you attempt to develop an accurate solution.

### **The TMA Plot (FFG)**

The TMA plot looks and functions a bit differently in the FFG. The plot represents a Dead Reckoning Tracer (DRT). The white dot (initially in the middle of the plot) is a light representing Ownship's position. The light moves along under the plot representing Ownship's course and speed. When the light reaches the edge of the paper the sheet must be torn off and all lines of bearing previously displayed are lost. They do not reappear when the contact is re-selected. You must create new ones by re-marking the contact if no tracker is assigned or waiting for the tracker's next two-minute report.

Once a contact is selected in the dropdown list, its lines of bearing remain on the TMA plot until the page is torn off. The lines are not removed when a new contact is selected as they are on the submarine TMA board. Each time a contact is marked, a line of bearing is added to that contact's record. The time that the mark was made (in minutes into the mission) displays at the end of each line of bearing.

Since all LOBs remain on the plot when a different contact is selected, you must click on an LOB to determine which contact ID that line belongs to. More on the FFG's TMA functionality is found in *FFG Stations/FFG TMA Station*.

### **Merging and Dropping Contacts**

A contact detected by two sources can be merged (and split apart again) at the TMA station. Merging contacts cleans up clutter and helps you better localize the contact. The Subs and the FFG handle this function slightly differently.

**Merged Contacts in the Subs:** Merging two contacts results in the data from both sensors being reported as a single merged contact in TMA and on the Nav Map in the Subs. The dual bearing reports on the merged contacts provide additional information and the location where the bearing lines from the two sensors intersect can be a good indication of the range to the contact. When contacts are merged in a submarine TMA station, the resulting contact is given an M (Master) designation. To split a merged contact back into its original components select it in the SELECT list and click Split. The tracks are split and revert to their original track numbers.

**Merged Contacts in the FFG:** When two contacts are merged, the merged contact retains the number of the contact showing in the upper Track Update Report. The contact number seen in the lower Track Merge Report is no longer seen in the Track selection dropdown. There is no indication that a track is merged except that when the track number is selected in the TMA Track Update Report, data from the merged sensor reports updates

as you watch. When FGG contacts are split they revert to their original track numbers.

### **The TMA Ruler**

Be it the FFG's flat ruler or the submarine's digital speed strip ruler, the TMA ruler is used to indicate your best estimate of the contact's course and speed. Its location on the board relative to Ownship indicates your estimate of the range of the contact.

TMA ruler is used to determine your best guess as to the course and speed of the contact. By adjusting the location and orientation of the ruler to fit the lines of bearing to a selected contact, the speed and course of the contact can be estimated and the suspected range to the contact and its suspected course are entered into the trial solution based on the rulers' location on the board or plot and its orientation.

Known or trial values for solution elements can be entered directly into the appropriate fields and the ruler moves to reflect those values. Any portion of the solution (range, bearing, course, speed) can be locked as different portions of the solution are verified.

### **Sub's Speed Strip Ruler:**

With each new bearing line that appears on the TMA Board an additional tick mark is added to the ruler. Each tick mark is associated with a dot in the stack in the upper left of the screen. Moving the ruler and adjusting the location of the tick marks allows you to line up the dots along the center vertical line.

When TMA Autocrew is off, the first time a contact is selected from the selection list, the speed strip appears at the end of the most recent line of bearing facing Ownship. It stays on that LOB until moved. For passive contacts this is a default range and not indicative of the actual range of the contact. When the end tick is on the correct LOB, the bottom dot in the stack is on the centerline of the dot stack.

The ruler components and functionality are described below:

- ❑ The arrowhead on the ruler indicates the *course* of the contact.
- ❑ The length of the ruler represents the current estimate of the contact's speed: the longer the ruler, the faster the estimated speed.
- ❑ The distance of the ruler from the Ownship marker represents the contact's estimated *range* at the time of any given LOB.
- ❑ Each tick mark represents a specific interval of time. (Towed and Bow arrays update every two minutes while radar and continuous active sonar update with every sweep or ping.) The tick mark at the end of the ruler represents the initial or oldest information.
- ❑ The *estimated current bearing* of the contact is a point just ahead of the arrowhead. The *last reported bearing* is represented by the tick mark closest to the arrowhead.

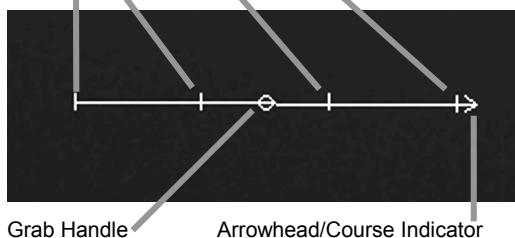
## Manipulating the Speed Strip Ruler:

**Adjusting length and direction:** Click and drag the end mark or the arrowhead to adjust the length or direction of the ruler.

**Positioning Tick marks:** The tick mark closest to the arrowhead should be placed on the most recent bearing line. The end tick mark should be positioned on the initial or oldest bearing line.

**Using the Handle:** A circle appears at the center of the ruler when more than one tick is present and speed is more than zero. The circle acts as a handle. Click the handle and drag the entire ruler to another location. The handle maintains the current course and speed settings of the ruler and adjusts range and bearing.

Initial bearing at time T, T+2, T+4, T+6, (Most recent sensor return)



Speed Strip Ruler showing returns sent every two minutes from a sonar tracker.

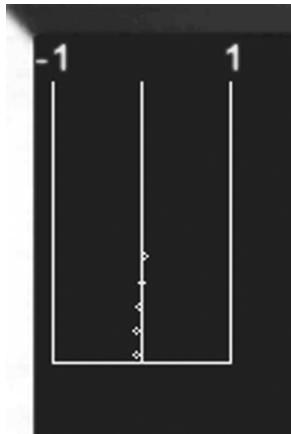
## FFG's Ruler:

The FFG has a separate ruler for each unique speed. Click or right-click the digits in the SPD field of the trial solution area or click the up and down arrow to the left of the SPD label to select a speed ruler with tick marks representing the selected speed. FFG's Ruler functionality is described below

- ❑ The ruler appears on the plot only when a contact is selected in the track update report and there are LOBs on the plot.
- ❑ The arrows on the ruler indicate the suspected course of the contact.
- ❑ Click the center of the ruler to move the entire ruler in its current orientation.
- ❑ Click on an end of the ruler to rotate the ruler on the axis of the other end.
- ❑ If a range greater than that of the viewable range is entered into the RNG field the ruler disappears from the TMA Plot. Enter a smaller range or reselect the contact from the dropdown list.
- ❑ A tiny circle indicates the probable location of the contact at this time, given the speed, range, course and time at the last reported LOB.

## TMA Dot Stack (Subs only)

The dot stack in the upper left corner of the Submarines TMA plot is a graphical representation of the error between tick marks and bearing lines. The dot at the top of the stack is associated with the most recent bearing line. The analysis is probably correct when the top most dots are on the centerline. This process is called stacking the dots. The FFG has nothing similar to the dot Stack.



## Trial Solution Area

As the ruler or speed strip is manipulated to determine a possible solution for a contact, the fields in the trial solution area are populated with the values represented by the ruler's location and orientation. Entering a value directly into one of the solution fields reorients the ruler to reflect the value entered. (No entry can be made in the FFG 's trial solution bearing field.)

## Entering a Firing Solution

Once you are confident that you have a plausible firing solution for the contact you have been analyzing, you can send the solution to the fire control system.

- ⇒ **Subs:** Click ENTER SOLUTION (ENTER SOLN in Seawolf).
- ⇒ **FFG-7:** Click ENTER at the lower right corner of the TRACK UPDATE REPORT notebook.

For complete instructions for performing TMA in the FFG-7 see *FFG Stations/FFG TMA Station*.

**Tip:** Be sure that you don't rush the TMA process. Before sending a report to the Fire Control system ensure that you have analyzed and manipulated bearing reports for some time and maneuvered Ownship as much as needed to eliminate all but a few possible solutions.

## Lines of Bearing (LOBs)

The color of each line of bearing (LOB) on the TMA board or Plot is an indication of which sensor detected the contact.

### Submarine LOB Colors

Bow sonar array:	White
Hull/Flank/Conformal array:	Blue
Towed sonar arrays:	Purple
Active sonar:	Green
Periscope or ESM:	Red
Radar and Active Intercept:	Yellow
UUV passive sonar	White
UUV active sonar	Green

- ✓ **Note for Sub Commander:** When a sonar tracker is assigned to a contact, bearing updates are automatically sent to the TMA board. While radar, ESM/EW, single-ping active sonar and periscope contacts appear in the list, these contacts are not updated on the TMA board unless you physically mark them again. The history for these contacts may contain only one line. Your Radar Autocrew, when activated, sends updates for radar contacts as long as the radar is on.

### FFG LOB colors

Hull sonar, passive:	White
Hull sonar, active	Green
Towed Array:	Purple
Sonobuoy, passive:	White
Sonobuoy, active:	White
EW:	Red
Lookout:	Red
Radar	Yellow

- ✓ **Note for FFG-7 Commander:** When an ATF (Automatic Tag Follow) tracker is attached to a passive sonar contact in Towed Array, bearing updates are sent automatically to TMA. If the ATT (Automated Target Tracker) tag is assigned to a single track in Active Sonar, bearing and range data are sent automatically to TMA. Contacts marked by active sonar (Hull Sonar or sonobuoys) or reported by the Lookout or FFG Radars appear in the Track list and appear on the TMA Plot with a tiny x at the end of the line of bearing at the reported range. The x only appears on the TMA Plot if the end of the LOB is visible in the currently selected TMA Plot range scale.

## Contact ID Naming Conventions

As tracks are detected and marked by various ship sensors they are assigned a contact ID or contact designation. Once marked, applicable Contact IDs appear in the SELECTED TRACKS dropdown list at the TMA Station where they can be selected and the available data on them is analyzed on the TMA Board or Plot. The conventions used to number contacts in S.C.S. - *Dangerous Waters* are explained briefly below. See *Navigation Station/ 2D Navigation Map/Contact Designations* for a full description.

**Submarine Contact IDs:** The submarine Contact IDs give you a clue as to which sensor has detected each contact. The first letter of the contact designation represents the source of the data: S for Sonar, R for Radar, V for visual (Periscope and Stadiometer), and E for ESM. TMA bearing lines are color coded to indicate the reporting sensor. Contacts detected by a submarine's sensors are given an alphanumeric contact designation. The first contact detected by Ownship's sonar is S01 and the second is S02. The first contact marked by Ownship's ESM sensor is designated E01, the fourth contact marked by a sub's Radar is R04, the third visual contact marked in the periscope is V03, etc. Each sensor maintains its own list. When two contacts are merged, the merged contact is designated with an M. Merged contacts are numbered sequentially as they are created.

Link contact numbers do not appear in the TMA list. Contacts marked by the ship's bow, hull and towed array sonar, ESM, Active Intercept, Radar and Periscope all appear in the TMA track list and can be manipulated and merged.

**FFG Contact IDs:** Your Platform ID number determines contact IDs for contacts marked by your FFG-7 sensors. In Single Player games, your Ownship Platform (Track) ID is always 1001. All tracks marked by any of your sensors are numbered sequentially from that number regardless of the sensor. The first contact marked is 1002 and numbering continues through 1299. In multiplayer games, each player's Ownship is assigned a platform ID as the game is loaded starting with 1001. The next player ID is incremented by 300, so the next player's Ownship ID is 1301, the next 1601, etc., up to 30 players. Each player's contacts are numbered based on their Platform ID up to 298 contacts.

Link contact numbers do not appear in the TMA list. Contacts marked by the FFG's towed array, hull sonar, EW sensor and sonobuoys appear in the FFG's TMA track list. For gameplay purposes contacts marked by the FFG Lookout and radars also appear in TMA so that you can merge them with contacts detected via your passive sensors. This helps clear up the Nav Map and eliminates multiple occurrences of 3D models in one location.

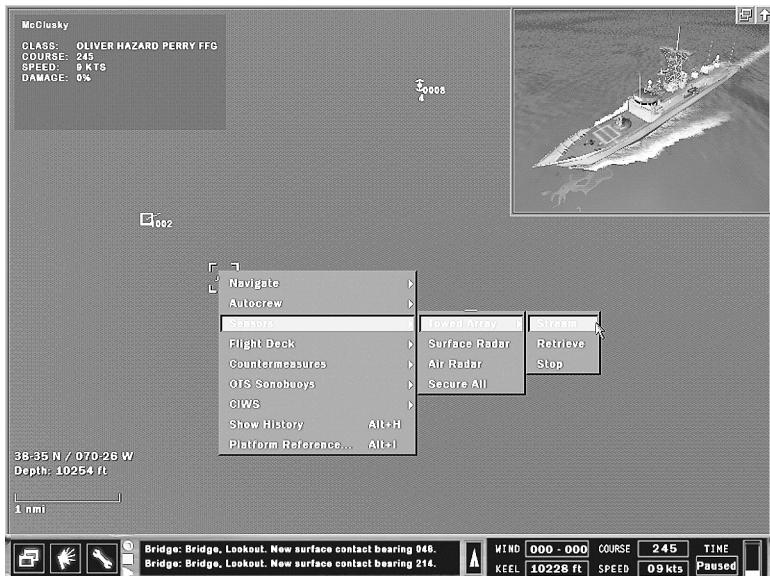
## **TMA ON UUV SENSOR CONTACTS**

All controllable submarines can carry Unmanned Underwater Vehicles (UUVs). UUVs in S.C.S. – *Dangerous Waters* have sonar capabilities only and cannot launch weapons. The lines of bearing for contacts detected by a UUV are drawn from the location of the UUV at the time of the report, not from Ownship's location. TMA on UUV contacts is performed as for any other sonar contact in active or passive mode.



## SECTION 6

# NAVIGATION STATION



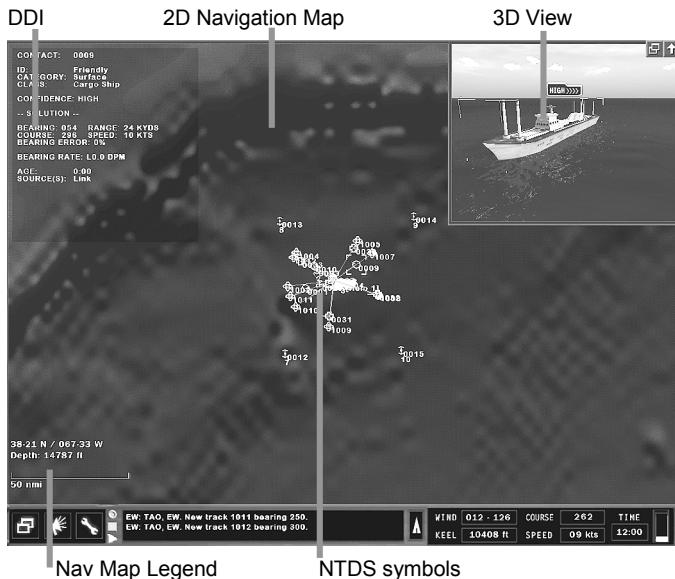
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## 6: NAVIGATION STATION

All missions begin in the Navigation Station. The components of the Navigation Station are the same across platforms and are explained here. For descriptions and functionality of the rest of a platform's stations, see the desired platform's Stations section. Information about any Navigation Station menu or feature that is unique to a specific platform is found within that platform's abbreviated Navigation Station section.

The Navigation Station, the Nav for short, consists of the **2D Navigation Map** (Nav Map), the **3D View**, and the **Digital Data Indicator (DDI)**. It is from here that you view water depth contours, nearby land features, and all contacts you have marked with your sensors, and set or change the classification for the contacts you have detected. When Show Link Data is on, contacts reported by Ownside Link participants in the mission are also visible on the map.

Many aspects of the game can be played from the Nav by utilizing your Autocrew, the Nav Map, Ownship and Contact Menus, the Task Bar's Orders Menu and voice commands. See *Playing From the Nav* later in this section.



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## 2D NAVIGATION MAP

The 2D Navigation Map (Nav Map) represents the 600 by 600 (nm) battle space. Not all of the battle space is visible. You must scroll up or down to view the hidden portions. Be aware that some contacts could be hidden behind the 3D window or above or below the visible area.

- ⇒ Click and drag in the Nav Map to view the hidden area.
- ⇒ Use the arrow keys to scroll the map in the direction indicated by the arrow.
- ⇒ Press [=] or [-] to zoom on the keyboard to zoom in and out on the Nav Map.
- ⇒ Press [CTRL] and click a map location to zoom in on that spot.
- ⇒ Press [CTRL] and right-click the map to zoom out.
- ⇒ Use the mouse wheel to zoom in and out.
- ⇒ For a full list of Nav Map related keyboard commands during gameplay, press [ESC] to display the System Menu, then select Options. From the Options Menu click Controls then select the Map checkbox to see the Map page.

The Nav Map displays **Naval Tactical Data System (NTDS) symbols** for Ownship and detected contacts and a **Map Legend** is located in the lower left corner. When a NTDS symbol is selected on the map, the **Digital Data Indicator (DDI)** overlays the upper left corner of the map with information about the selected contact. See *Navigation Station/Digital Data Indicator (DDI)*.

The **3D View** and view controls appear in the upper right corner of the station. See *Navigation Station/3D View*.

Clicking on a Nav Map NTDS symbol selects it. Clicking on the Nav Map deselects any selected symbol. Right-clicking on the map when nothing is selected displays the **Nav Map Menu**, which provides a means for filtering the symbols and user-placed map objects that appear on the map as well as a means for adding navigational aids and information to the map. Right-clicking on the selected Ownship symbol (a blue circle with cross bars in the center) reveals the **Ownship Menu**; right-clicking on a selected contact symbol displays the **Contact Menu**. The Ownship and Contact Menus are nearly identical across platforms and the common menu options are covered in this section. Any menu item that is platform specific is covered in the specific platform's Navigation Stations section.

### NAV MAP LEGEND

The lower left corner of the map provides the following information:

- **Latitude and Longitude:** At the location of the cursor.

- Depth/Height:** Displays the depth of the water or the altitude of the land at the location of the cursor.
- Range scale:** In nautical miles and yards (when the scale is less than 1 nm.)
- Ice Coverage:** As a percentage when ice is present at that map location.
  - ⇒ Press [SHIFT] and X to toggle the display of the latitude and longitude, depth and when visible, the Ice coverage info.
  - ⇒ Press [SHIFT] and Z to toggle the display of the range scale.

## NTDS SYMBOLS

Ownship and contacts are displayed on the 2D Map as Naval Tactical Display System (NTDS) symbols. These symbols use shape and color to convey a platform's category (surface, sub surface, helo, airplane etc) and its alliance ID (friendly, hostile, neutral etc), referred to simply as ID in the game.

## Colors

*S.C.S. – Dangerous Waters* uses the following colors to denote side alliances.

Color:	ID:
Blue	Ownside/Friendly/Assumed Friendly
Orange	Allied
Red	Hostile/Assumed Hostile
Yellow	Unknown
Green	Neutral

When a platform is destroyed, its symbol turns a shade of grey depending on its alliance. Destroyed platforms belonging to Ownside appear as a light shade of grey while all other destroyed platforms display as a dark shade of grey. When Show Dead Platforms is ON in the *Options>Game* screen, symbols for 100% destroyed platforms appear in an appropriate shade of grey on the 2D Map in their true location whether you have detected them or not.

## Alliance IDs

*S.C.S. – Dangerous Waters* uses the following definitions when assigning alliances to contacts in missions.

Friendly	Contacts that are either Ownside or allied to Ownside are designated Friendly.
Assumed Friendly	Contact is most likely friendly.

Hostile	All platforms, weapons, and land-based sites identified as belonging to countries hostile to Ownside.
Assumed Hostile	Contact is most likely hostile.
Neutral	All platforms allied with neither Friendly or Hostile sides.
Unknown	Any contact not yet identified as Friendly, Hostile, or Neutral.

## Symbol Shape

The shape of a symbol provides important information concerning the contact's category or type. Symbols for ships, submarines, airplanes and missiles have a different symbol shape depending on its alliance. Some symbols are the same shape regardless of alliance. In those cases, you must rely on the color of the symbol to determine the alliance of the contact. See *Colors* above.

Symbol	Object	Symbol	Object
	Ownship		Missile, Ownside/Friendly
	Unknown		Missile, Hostile, Unknown
	Submarine, Ownside/Friendly		Torpedo
	Submarine, Hostile		Helicopter
	Submarine, Unknown		Mine
	Submarine, Neutral		Land-based Object
	Aircraft, Ownside/Friendly		Downed Pilot
	Aircraft, Hostile		Explosion
	Aircraft, Unknown		Special Forces Team
	Aircraft, Neutral		UUV (Unmanned Underwater)
	Surface Ship, Ownside/ Friendly		DSRV (Deep Submergence Rescue Vehicle)
	Surface Ship, Hostile		Biologic

	Surface Ship, Unknown		Sonobuoy]
	Surface Ship, Neutral]		

## OWNSHIP AND LINK PARTICIPANT PLATFORM IDs

In S.C.S. – *Dangerous Waters* the platform you are commanding is referred to as Ownship regardless of the type of platform. Ownship can be a sub, ship, airplane or helicopter. All platforms on Ownside belong to a communication network referred to simply as the Link in this manual.

Ownside platforms (blue symbols) send periodic reports to the Link sharing their own location plus the location, suspected alliance ID and track number of each contact they detect. Platforms that report in the Link are referred to as Link participants. Link functionality is modeled for each Ownside in a Multiplayer game. Each controllable platform is part of a Link that includes all platforms assigned to the same side.

Unknown, neutral and hostile contacts detected by Link participants are called Link Contacts. The numbering paradigm for Link Contacts is described below. See *Contact Designations (Contact/Track IDs)* below.

Ownship and Link participants are assigned a unique four-digit platform (Track) ID number. These platform IDs are visible on the Nav Map and in some other stations when Show Link Data is on. The four-digit number appears beside the appropriate NTDS symbol on the Nav Map. (See *Navigation Station/2D Navigation Map/Nav Map Menu* below or *Main Menu/Options/Game* for information on Show Link.)

- ❑ In **Single Player mode**, Ownship Platform ID (track number) is always 1001 regardless of the controllable platform you are commanding.
- ❑ In **Multiplayer mode** your Ownship ID always ends with 01 but the first two numbers will vary depending on the number of players in the game and the order in which your platform is loaded into the game. Each Ownship platform ID is unique and separated by 300 digits. The first Ownship loaded in the game is always 1001. All players in multiplayer game, regardless of side, are part of this numbering system. You only see Platform (Track) IDs for platforms in your Ownside Link when Show Link Data is ON. Submarines only see Link data when at comms depth with the radio antenna extended or the floating wire deployed.
- ❑ In a **Multi-Station** multiplayer game all players on the same platform see the same Platform ID for Ownship.
- ❑ **AI Link Participants** always have platform IDs that begin with 0 regardless of mode or side.

## CONTACT DESIGNATIONS (CONTACT/TRACK IDs)

When a contact is designated or marked by an Ownship (OS) sensor it is given an alphanumeric or a four-digit **Contact ID** used to identify the

contact on the Nav Map, TMA station, Fire Control and other stations in the game. The form of the designation, called a Contact ID (also Track ID or track number) depends on the type of controllable platform you are commanding. The format used by submarines in the game differs from the format used by the surface and air platforms.

- ✓ **Note:** The numbering system described below assumes Show Link is ON and Show Truth is OFF. When both are ON, only Truth track numbers display and are different from those you see when Show Truth is OFF.

### **Contact IDs When OS is a FFG, P-3C or MH-60R**

**Single Player Mode:** When the FFG, the P-3C or the MH-60R is your Ownship your platform ID is always 1001. Each track marked by one of Ownship's sensors is numbered sequentially based on Ownship's ID number. The first contact marked is 1002, the second 1003...up to 1299).

**Multiplayer Mode:** In Multiplayer games the first player-controlled platform that loads is assigned platform ID 1001 and his tracks are numbered as described above. The next available player-controlled Platform ID number is 1301. Tracks marked by that player-controlled platform are numbered sequentially from the OS platform ID (in this case 1302, 1303 ...up to 1599 etc.).

When the FFG, P-3 or MH-60R is Ownship, each player sees the tracks that he marks with his Ownship sensors and any tracks reported by AI Link participants. He does not see any contact marked by any other player-controlled member of his Link until the other player promotes the contact to the Link. Once a contact is promoted, players in the Ownside Link see the symbol and the track number. See *Navigation Station/2D Navigation Map/Contact Menu/Promoting a Contact to Link*.

- Only contacts that you mark with your sensors are assigned numbers from your track number allotment. Buoys and weapons launched by Ownship are not numbered from this allotment but have track numbers that start with 0.
- When Ownship is a FFG and you launch your embarked AI helicopter (or the AI helicopter is airborne at mission start) the helicopter is numbered as an AI Link participant and has a track ID that starts with 0. See *Navigation Station/2D Navigation Map/Contact Designations/AI Link Participant Contact Designations* below. Player-controlled MH-60Rs are always airborne at game start and have track numbers as described above.

### **Contact IDs When OS is a Submarine**

**Single Player Mode:** When a submarine is your Ownship, its Platform ID is 1001 as with other platform types, but contacts marked with OS sensors have alphanumeric designations consisting of a letter followed by two digits. The letter in the contact ID represents the Ownship sensor that is reporting

the data. The numbers indicate the order in which the contact was marked by that sensor.

**S** for Sonar (passive, active, UUV)

**R** for Radar

**V** for visual/periscope

**E** for ESM

**M** for contacts merged in TMA

The first sonar contact detected by a submarine Ownship is S01 the second is S02 etc. The first ESM contact is E01 etc. A submarine can mark a total of 298 contacts within this numbering system.

**Submarines in Multiplayer Mode:** As with the surface and air platforms, your submarine Ownship Platform ID is determined by the order in which your controllable platform is processed when the game loads. This is described in *Navigation Station/2D Navigation Map/Ownship and Link Participant Platform IDs*. During gameplay you see alphanumeric contacts as described above. However behind the scenes, all tracks marked by your submarine Ownship are also assigned a four-digit track number following the track numbering scheme used by the FFG and controllable aircraft. When you promote one of your contacts to the Link, it is the four-digit track number that is seen by other players in your Link. When you select the promoted contact on the Nav map, the four-digit number seen by the other Link participants on their Nav Maps appears in parentheses in the 'Promoted' field in the DDI following the time at which the contact was promoted. See *Navigation Station/2D Navigation Map/Contact Menu/Promoting a Contact to the Link*.

## AI Link Participant Contact IDs

Each AI controlled Link participant automatically reports his own position and the position and classification of any contacts he detects. The Link takes the first instance of an AI report so if all AI Link participants detect a given contact, the first Link participant to report it is credited with the report. Subsequent reports by other AI participants are ignored. This helps reduce map clutter.

- ✓ **Note:** When you are commanding a submarine in S.C.S. – *Dangerous Waters* you see Link data only when your ship is at comms depth with the radio mast extended or the floating wire streamed. In order to see the location of an AI submarine in your Link, the AI sub must also be at comms depth and reporting data at the moment that you are downloading Link data. The chances of this are slim since you have no control over AI submarines. It is highly likely that you will never know the location or existence of other Ownside subs in a single player mission. In Multiplayer games you can communicate with players on your Ownside via Ownside chat messages and arrange to come to comms depth and extend your radio masts at the same time. You must have your radio mast

extended to transmit your location to other Link players. The wire does not transmit.

- ❑ AI Link participants and their reported contacts are assigned four-digit ID numbers that begin with 0.
- ❑ LINK appears in the DDI Source field when a contact reported by an AI Link participant is selected on the Nav Map. The track number of the AI Link participant that reported the contact follows in parentheses.

**Tip:** To easily differentiate between OS contacts and Link Contacts on the Nav Map, select *Layers>Hide Link Data* from the right-click Nav Map Menu. Only Ownship detected contacts are now visible on the map. You can also press [Tab] to move the selection cursor between symbols on the Nav Map. Check the Contact field at the top of the DDI and the Source field at the bottom of the DDI to determine the track number and source of the report.

## OWNSHIP CONTACTS WITH LINES OF BEARING (LOB)

Some Ownship sensors report only a line of bearing to a contact. Such a contact first appears on the Nav Map as a symbol at the end of a colored Line of Bearing (LOB). The default length of the LOB depends on which sensor has detected it. The NTDS symbol in use is usually the yellow unknown symbol indicating Unknown Category and Unknown ID (alliance). See *NTDS Symbols* above. The Contact ID number accompanies the symbol on the Nav Map. The color and default lengths for lines of bearing are shown below.

**Passive Sonar Contacts:** All passive LOBs are 10 nm long

**Sphere/bow /Cylindrical (Subs); Hull (FFG):** White LOB

**Hull/Conformal (Subs):** Blue LOB

**Towed Array:** Purple LOB

**UUV passive sonar contacts (Subs only):** White LOB 10 nm from the UUV.

**Sonobuoys (Directional mode):** White LOB 10 nm from the buoy.

**Dipping Sonar (helo) Passive:** Blue LOB 10 nm from sensor

**Active Sonar Contacts:** Green LOB at the range reported by the sensor.

**UUV active sonar contacts (Subs):** Green LOB at the range from the UUV reported by the sensor.

**Sonobuoy (Active Mode):** White LOB at range (from buoy) reported by the sensor.

**Dipping Sonar (helo) Active:** Green LOB at range reported by the sensor.

**ESM/EW Contacts:** Red LOB 20 nm long.

**Visual (Periscope) contacts (Subs):** Red LOB 10 nm long.

**IR Camera Contacts (P-3):** Magenta LOB at the range reported by the camera.

**Radar Contacts (Subs):** Yellow LOB with the symbol located at the range reported by the sensor.

- ✓ **Note:** Contacts detected by the FFG Radar or detected visually by the FFG Lookout, the P-3C and the MH-60R, as well as Link contacts appear on the Nav Map with no lines of bearing. A contact for which you have created a TMA solution (subs and FFG) also has no LOB once the solution is entered in the system.

## CONTACTS WITH NO LINE OF BEARING

Depending on which platform you are commanding you may see many contacts that have no lines of bearing. Contact symbols that appear on the Nav Map with no lines of bearing indicate that you, your Autocrew or members of your Link have determined and entered a solution for the contact.

A **solution** is your best guess as to the location (bearing and range), speed and heading of the contact. For the FFG and the subs, a solution for some Ownship-detected contacts are created and entered in the TMA station.

See *Training/TMA Basics* or the *FFG Stations/FFG TMA Station* or the *TMA Station* portion of the manual in the appropriate sub's Stations section. In the game context, a solution is where you think the contact is. Truth is where the contact is in actuality. Show Allies displays the Truth location for all Ownside platforms. Show Truth shows the actual location, speed and course of every contact in the game. Solutions are represented on the Nav Map by NTDS symbols that have no line of bearing. Some symbols appear at the proper location (range and bearing from the detecting sensor) but no speed or course is known. These contacts retain a line of bearing until a solution is entered. Aircraft in the game have no means for entering a solution. Place a manual solution at the suspected location and classify it. There is no way to assign a speed or course to a manual solution in the P-3C or helo in S.C.S. – *Dangerous Waters*.

When Show Link Data is ON, the participants in your Link network provide fairly accurate solution information for their own location as well as the location of any contacts they are detecting. These solutions appear on the Nav Map with no lines of bearing. The solution for a Link reported contact is usually fairly accurate as long as the contact is regularly updated.

- ✓ **Note:** This manual assumes that Show Link Data is ON and Show Allies and Show Truth are OFF. Link participants appear as Truth objects on the Nav Map when Show Allies and Show Truth are on. Track numbers in use for truth objects differ from those assigned by Link participants and Ownship sensors when Show Truth is OFF during gameplay.

**Submarines:** When TMA Autocrew is OFF, nearly all of Ownship detected contacts retain their lines of bearing until you develop a firing solution for the contact at the TMA Station. See *Training/TMA Basics* and the TMA Station section for the desired submarine for more information on creating TMA solutions.

Once your TMA solution is entered at the TMA Station, the contact symbol appears on the Nav Map at the location designated in the solution. The line of bearing disappears and the symbol begins moving on the Nav Map on the course and at the speed entered in the solution.

Visual contacts marked in the submarine periscope have a line of bearing on the Nav Map. You must use the submarine's Stadiometer to determine the contact's range and course and enter that data as part of the TMA solution for the contact before its LOB is removed.

Link contacts are only visible when at comms depth and when the floating wire is deployed or the radio antenna is extended. Link data automatically appears on the Nav Map under these conditions if Show Link Data is enabled in the *Options>Game* screen or via the Nav Map Menu's *Layers>Show Link Data* option. Once the sub submerges, the Link contacts are not updated but remain on the map moving on the course and speed designated in the solution provided by the Link participants. Select the contact and check its age in the DDI. Show Link Data is on by default, but at game start no Link contacts appear on the Nav Map because no sub begins a mission with the floating wire or radio mast deployed.

- ✓ **Note:** In the subs, only a snapshot can be fired at a contact that has a line of bearing, and then only if the contact has been designated as a surface or subsurface platform so the system knows the weapon is appropriate for the contact.

**FFG:** The FFG's Radar, when on, reports contacts on the Nav Map with no line of bearing. The FFG's Forward and Aft Lookouts report all visual contacts as soon as they are detected. These also appear with no line of bearing because the Lookout provides a solution based on his observation. He also categorizes the contact (surface, air, etc.) and may also classify it (Fishing Boat etc.) if it is close enough to Ownship. Contacts detected by the deployed helo are processed by REMRO and appear on the Nav Map as an Ownship contact. Heli and ship dropped sonobuoys are processed in the ship's Acoustic station. A buoy contact marked in Directional or Active mode appears on the Nav Map and in TMA with a line of bearing from the location of the sonobuoy. The FFG's Towed Array, Hull Sonar and EW sensors also report contacts that appear at the end of a line of bearing. These contacts must be manipulated in the TMA Plot to determine a probable solution. When the solution is entered at the TMA Station, the contact's symbol appears on the Nav Map without a line of bearing and moves on the course, speed, range and bearing from Ownship designated in the entered solution. Contacts reported by OS helo appear on the Nav Map as solutions with no bearing lines.

When you select the NTDS symbol for your FFG Ownship or your deployed Heli, the DDI contains no “Solution” area. Instead the actual (true) class, course, speed, and % of damage appears in the DDI when they are selected. The actual altitude of your helo is also displayed. Your ship’s systems report your ship’s exact location and that of your helicopter even when the helicopter is over the horizon; however, you lose Sync with the helo when it is over the horizon. (See *FFG Stations/ASTAC Station* for more information on Helo Sync.)

**P-3C and MH-60R:** All surface and air contacts that are visually detected and contacts marked with radar appear as solutions on the Nav Map. When radar Autocrew is ON, radar contacts are updated every two minutes. Sonobuoy and ESM contacts appear on the Nav Map at a default range at the end of a Line of Bearing. In the P-3C contacts marked with the IR camera also appear at the end of a line of bearing at the range reported by the camera. (See *Navigation Station/2D Navigation Map/NTDS Symbols*.)

There is no TMA Station in the P-3C or MH-60R thus, there is no way to create a solution for LOB contacts. If the map becomes too crowded select the contact and right-click on it to display the Contact Menu. Select *Drop Track* from the Contact Menu to remove the contact and its LOB from the Nav Map. If the reporting sensor is still creating reports, the symbol will return on the next report.

You can also select **Add Manual Solution** from the Nav Map Menu then click the spot along the bearing line where you think the contact is located. The manual solution can be classified but it will not move on the map like a TMA solution since there is no way to enter the course and speed for the solution. Manual solutions can be targeted.

**Link Contacts:** Link reported contacts never have a line of bearing. They always appear on the Nav Map as a solution, usually a fairly accurate one. Link participants continue to report contacts and update their solutions even if Link data is hidden as long as the reporting platform has not been destroyed. These contacts reappear when Show Link Data is selected again.

## CONTACT CLASSIFICATION

Classification is the process of determining the category of the contact (surface ship, submarine, air etc.), its specific named class and its alliance ID (Friendly, Hostile, Neutral etc.) Additionally you can assign a level of confidence to indicate how certain you are in the classification you have assigned (Low, Med, or High).

The symbol for a contact changes shape once it is categorized. In some cases the shape of the symbol indicates its ID as well as its category. (See *Navigation Station/2D Nav Map/NTDS Symbols* earlier in this section). You can assign a category, ID or a level of confidence individually to a selected contact from the Contact Menu’s *Category/ID* option or select a specific class and ID from the Contact Menu’s *Classify Contact* option described below.

Narrowband sonar and sonobuoys in Omni or Directional Mode, ESM/EW or the Stadiometer in submarines all provide a means for determining the class of a contact. In some of these stations the category and class is applied to the contact when it is marked. These stations are covered individually within each platform's Stations section. (For information on the Contact Menu options see *Navigation Station/2D Navigational Map/Contact Menu*.)

Link contacts represent solution information provided by participants in your Link network and usually include a classification. If you attempt to change the classification of a Link contact or of a contact detected visually by your P-3 or MH-60R crew or by the FFG Lookout, the classification reverts to the designation generated by the reporting platform or sensor on the next report. Only contacts detected by your Ownship sensors can be classified.

## NAV MAP MENU

Right-clicking on the 2D Map surface when nothing is selected displays the Nav Map Menu. The Nav Map Menu contains a variety of tools that allow you to customize the Nav Map interface by adding markers and labels and filtering which symbols, text or other map aids display there. The Nav Map Menu items are described below.

**Filters:** Displays a submenu of filters to toggle the display of specific map objects.

**ID:** Displays a submenu of options relating to the ID (presumed alliance) of a contact.

    Show/Hide Threats: Toggles the display of all contacts designated Threat.

    Show/Hide Allies: Toggles the display of all contacts designated as Ownside Allies.

    Show/Hide Neutrals: Toggles the display of all contacts designated Neutral.

    Show/Hide Unknowns: Toggles the display of all contacts designated Unknown.

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**Tip:** If Show Truth is ON and contacts you expect to see do not appear on the Nav Map check to see if you have inadvertently turned off the display of one or more of the alliance IDs.

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**Hide/Show Tags:** Toggles the display of the nametags of all platforms and weapons next to the appropriate symbol. The nametag that displays is that of your classification for each contact, which may or may not be correct. Link designations have a high probability of accuracy.

**Hide/Show Tracks:** Toggles the display of all alphanumeric and four-digit contact IDs.

**Hide/Show Marks:** Toggles the display of all markers you have placed on the map. See Drawing Tools below.

**Hide/Show Area Circles:** Toggles the display of any area circles you have placed on the map. See Drawing Tools below.

**Hide/Show Lines:** Toggles the displays of any lines that appear on the Nav Map. Lines cannot be entered by the user during game play but may have been added by the scenario developer in Mission Editor.

**Hide/Show Labels:** Toggles the display of any labels you have placed on the map. See Drawing Tools below.

**Layers:** Displays a submenu of options used to toggle the display of several GAME Options.

**Show/Hide Link Data:** Link Data is visible by default. Selecting this option toggles the display of the NTDS symbols representing contacts detected by Link participants and Link participants themselves. When Hide Link Data is selected, all contacts detected by participating members of the Link do not display on the Nav Map. If Hide Allies is also selected, Link participants disappear as well. As modeled in *S.C.S. - Dangerous Waters* the Link is secure, two-way, real-time data transmission between Ownside's ships, aircraft, subs and satellites. This sharing of information results in fairly accurate position, ID, Category and classification of any contacts detected by Link participants.

Submarines are not on the link until they are at comms depth with an appropriate communications mast deployed to receive or send Link data.

- ✓ **Note:** In Single Player *S.C.S. – Dangerous Waters* missions, Link participants report all contacts to Ownship. However, Ownship contacts are not automatically reported to the Link. If you want to notify the A.I. platforms in the Link of a specific contact that you hold, you must right-click on the contact and select **Promote to Link** from the Contact Menu. Be aware that if you promote the contact as hostile, Link participants may attack it whether you want them to or not. In Multiplayer games, players on Ownside do not automatically share contacts with other members of the Link. Each player on the same side must promote his own contacts to the Link before other players in his Link can see them. AI Link participants still share their contacts automatically. When separate players man the FFG and its deployed Heli, the FFG REMRO marks contacts detected by the deployed Heli as FFG contacts when REMRO is ON. See *FFG Stations/ASTAC Station* and *FFG Stations/Weapons Coordinator Station*.

**Show/Hide Truth:** Truth is hidden by default. Select Show Truth to display the true location and identity of all platforms and objects in the game on the Nav Map and in the 3D View. See *Main Menu/Option/Game>Show Truth*.

Be aware that turning Truth ON and OFF clears the Target Queue on the FFG and removes any assigned targets from the launchers. Track numbers that display when Show

Truth is ON are different from the ones marked by OS Sensors or reported by the Link when Show Truth is OFF.

**Show /Hide Allies:** Toggles the display of the symbols representing Link participants. These symbols represent the true location and identity (Truth) for all platforms on Ownside and any platforms designated as allied with Ownside during mission creation. See *Main Menu/Options/Game>Show Allies* and *Show Truth* for more information.

**Show/Hide Country Borders:** Select this option to toggle the display of country land borders on the Nav Map.

**Drawing Tools:** Displays a submenu of tools for creating Nav Map aids

**Add Mark:** Select this option then click the map to place a marker at the clicked location. Double-click the marker to add a label to the marker. You can also place the cursor at the desired location and press [Enter] to place a mark at that location.

⇒ Click on the mark and press [Delete] to delete the marker and the Label.

**Add Area Circle:** Select this option, click the map to place the center of the circle, then drag the cursor to define the radius of the circle. Click again when the circle is the desired size. Double-clicking on the center of the circle displays a dialog allowing you to change the radius of the circle and create a label. Click the digits to increment the value. Right-click to decrease the value.

⇒ To delete an area circle, click the center point of the circle and press [Delete].

**Add Range Circle:** Range circles can be added to Ownship and any platform symbol. Select this option then position the cursor over Ownship or the desired contact. The cursor changes shape when it is over a valid contact. Click the contact and drag the circle to the desired size. Click again to place the circle.

⇒ To delete a range circle, select then right-click the platform to display the Contact Menu, then select Remove Range Circle.

**Add Manual Solution:** Select this option then click the map to manually add the yellow contact symbol for Unknown Category/Unknown Alliance ID to the Nav Map. This option might be used when you suspect a contact is at a certain location. (This option is not available when Show Truth is ON.) Once entered, a manual solution contact can be classified and fired upon.

- ❑ When Ownship is a submarine, the designation for a manual solution starts with **Z** and is followed by a two-digit number up to 99.
- ❑ When Ownship is the FFG or either of the aircraft the track designation for a Manual Solution is a four-digit track number based on Ownship's Platform ID.
- ❑ The DDI lists 'Manual' in the 'Source' field when a manual contact is selected.

- ❑ When OS is a sub or a FFG, a Manual Solution track designation can be selected in the TMA station and given a course and speed. Once these are entered in the TMA station, the contact moves on the designated course and speed.

**System Menu:** Select this option to display the System Menu. The System Menu is not a submenu but a separate menu. By default, pressing [Esc] also brings up the System Menu. The game is paused when the System Menu is selected. The following options are available:

**Resume:** Select this option to leave the System Menu and resume gameplay.

**Options:** Displays the Options Menu.

**USNI Reference:** Displays the USNI Browser.

**Mission Status:** Displays the Mission Status screen giving you access to your captain name, mission name, score, elapsed time, the mission goals and a list of platforms you have destroyed up to this point in the game.

**Save:** Displays the Save Dialog then returns you to the game.

**Save and Exit:** Displays the Save Dialog then exits the mission.

**End Mission:** Exits the mission without providing an opportunity to save the mission.

## CONTACT MENU

Once a contact appears on the map, select it by clicking on its symbol then right-click on the selected contact to display the Contact Menu. From this menu you can assign a classification to the contact as well as attack it or find information about it as described below.

- ✓ **Note:** Some options only appear when a specific type of platform is Ownship.

**Engage With:** Displays a menu of weapons appropriate to engage the selected target. What appears in this menu depends on current weapons loaded on Ownship. If only weapons inappropriate for the target remain, the Engage With option does not appear. This option also is not available under the following conditions:

- ❑ When the contact is designated as Friendly or allied (blue or orange symbol),
- ❑ When the category of the selected contact is unknown.
- ❑ When no weapon appropriate for the selected contact is currently loaded in a tube or launcher

From the Nav Map you can engage a Link reported contact but not a Link participant.

- ⇒ Select the desired weapon from the list to launch it at the contact. Some weapon names are greyed out if the certain specifications

are not met for launch. These are described in the Stations section for the appropriate platform.

**Spec Ops:** (Submarine Ownership only) Displays a submenu of Special Operations options. The DSRV and/or Special Forces Unit is added to a sub's loadout during mission creation and cannot be added from the weapons loadout screen. These options are greyed out if the conditions described below are not met.

**Deploy DSRV:** Select this option to Deploy the Deep Submergence Rescue Vehicle to travel to the selected contact. The DSRV is a mini submarine used to rescue crewmen from downed submarines. This option is only selectable when the following conditions are met:

- The DSRV is present on the sub's hull. (The DSRV is only available if the mission creator added it to the mission.)
- The selected contact is a submerged submarine.
- Ownship depth is greater than periscope depth.
- Ownship speed is 3 kts or less.

**Deploy Special Forces:** This menu is greyed out until speed and depth requirements are met. It is available only in the Contact Menu for surface ships and landbased (Category: Stationary) targets such as buildings or the floating Oil Rig, and only under these conditions:

- Ownship has Special Forces aboard. (Special Forces are only available if the mission creator added it to the mission.)
- Ownship is traveling at periscope depth or less and at 3 kts or less.

**Designate Category/ID:** Displays a submenu of options that permit you to change how the selected contact looks on the Nav Map and in 3D view. This menu option does not display for Ownside tracks when Show Allies is on or for any track when Show Truth is on. See *Main Menu/Option/Game>Show Truth*.

**Platform Category:** Select the desired option to assign that platform type to the selected contact: Surface, Submarine, Air, Helo, Unknown, Stationary, Mine, Weapon (torpedo) or Missile. The contact's symbol changes shape to that of the designated platform type.

**ID:** Select the desired option to assign that alliance ID to the contact: Friendly, Assumed Friendly, Hostile, Assumed Hostile, Neutral or Unknown. The contact's symbol changes color to that of the designated ID and the selected option appears in the ID field in the DDI when the contact is selected. See *NTDS Symbols /Colors*.

**Confidence:** Select the desired option to assign the level that best describes how confident you are in the accuracy of your classification. (Low, Medium or High.)

**Classify Contact....:** Selecting this option displays the Classification Dialog. This option does not display for allies or when Show Truth is on. See *Main Menu/Option/Game>Show Truth*.

Once you have a good idea of a contact's class use the Classification Dialog to assign that classification to the contact and designate a level of confidence in your assessment.

1. From the class list, select the desired class name. To narrow your search, use the *Sort By:* drop-down to eliminate all platform types but the type for which you want to search: Submarines, Surface Ships, Aircraft and Heli.
2. Click the desired class name to assign that class name to the contact. Information and a photo of the selected class appear on the right side of the dialog box.
3. Click LOW, MED or HIGH to indicate your level of confidence in this classification. The classification name and your level of confidence appear in the DDI whenever the contact is selected on the map.
4. Assign an alliance ID to the contact. Click Assumed Friendly, Friendly, Assumed Hostile, Hostile, Neutral, or Unknown.
5. Click the OK check to accept the classification. Click CANCEL X to return to the game and negate your changes.
6. When you click OK your classification is applied to the contact and the contact's symbol appears as that of the specified platform type.
7. When you click a classified contact in the Nav Map, a 3D model of that platform class appears in the 3D view. The 3D view displays whatever class you have assigned, whether the classification is correct or not.

**Drop Track:** Select this option to remove the NTDS symbol of any contact detected by your OS sensors from the Nav Map and from the TMA contact list. If you drop a Link track the Link will report it again if it is still able to report. If the track is assigned to a launcher when the track is dropped, the launcher returns to its unassigned state. If a track is assigned to a weapon in a torpedo tube or pylon when the track is dropped, the weapon remains assigned to a default runout bearing or the bearing of the dropped target depending on the platform.

**Promote to Link:** Select this option to provide the Link participants with your solution assessment and classification of the selected contact. See *Promoting a Contact to the Link* below. (If you are commanding a submarine, this option only appears in the Contact Menu when you are at comms depth for your submarine and have the radio antenna raised.) This option only appears for contacts marked by OS sensors and Manual Solutions. You cannot promote a Link contact or Link participant.

**Show/Hide History:** Select this option to toggle the display of the contact's dot trail on the map indicating the movement of this contact as you have tracked it with your sensors.

**Platform Reference:** Displays the USNI Reference entry for the selected contact as classified by you. If you classify the contact as a Kirov, the entry for Kirov appears, even if the contact is really a cruise ship. If you have not classified a contact, no information appears.

- ✓ **Note:** USNI Reference provides information on military ships, military aircraft and civilian ships as modeled. No information is available for civilian aircraft and sailing vessels or buildings.

**Remove Range Circle:** If a range circle has been added to the contact's symbol, this option becomes available. Select this option to remove the range circle.

### **Promoting a Contact to the Link**

One task that can only be accomplished at the Navigation Station is the sharing of your "local" contact data with other members of your Link. Local contacts are contacts detected and marked by Ownship's sensors. As modeled in S.C.S. – *Dangerous Waters* the Link is a network of ships, subs, aircraft and buildings belonging to Ownside. The entities in the Link share position reports and sensor contact information via secure transmissions. What is reported to you by the Link depends on whether you are playing a single or multiplayer game. In both cases you must report your own local contacts individually to the Link.

**Single Player Mode:** In single player S.C.S. - *Dangerous Waters* games, the game's Artificial Intelligence (AI) controls all Link participants. The Link automatically reports all contacts they detect to Ownship. (If you are commanding a sub, you must come to comms depth and raise the radio mast or extend the floating wire to see the Link data on the Nav Map.) When Show Link Data is ON (it is on by default) you see members of the Link at their last reported position as well as the contacts they have detected. The AI Link has its own numbering system. Link participants, as well as their reported contacts, are assigned IDs that begin with 0.

Ownship contacts are not automatically reported to the Link. It is possible that you hold contacts that are unknown to the Link platforms in the area. If you are controlling an aircraft, you may be tasked to report your contacts to the Link so that other platforms in the Link can target the contacts. To share a local contact you must promote it to the Link. (See steps below.) If you promote the contact as hostile, the AI Link participants will attack it. Link participants will attempt to ID any platforms you promote as unknown.

**Multiplayer Mode:** In Multiplayer games, Link participants that are controlled by other players do not automatically share Link data. (AI controlled Link platforms continue to send Link data automatically.) Each player on the same side must promote his individual contacts to the Link. When you promote a contact to the Link, other players in your Link see a contact symbol on their Nav Map at the longitude and latitude of the contact at the time of the promotion. If you have determined a solution for the contact in the TMA station (Subs and FFG only) that solution is also uploaded to the Link and the contact will move on the map at the promoted course and speed.

- ❑ Subs must be at Comms Depth and have the radio mast extended to promote a contact. Link data can be downloaded via the floating wire but cannot be uploaded (promoted) through the wire. (Comms depth

varies by sub class. Check *Appendix C: Submarine Max & Mins* for a listing of comms depth for each controllable class.)

Each controllable platform in a Multiplayer game has its own set of Ownship contact ID numbers. Up to 298 tracks detected and marked by each Ownship's sensors are assigned Contact IDs based on Ownship's ID. (Platform 1001 assigns track numbers 1002 – 1299. Platform 1301 assigns track numbers 1302-1599; Platform 1601 assigns track numbers 1602 – 1899 etc.)

The AI Link participants and the contacts they report use a separate set of track numbers which all begin with 0. When you promote a track to the Link, the track number that appears on the Nav Maps of other player-controlled Link participants is the same number you see on your Nav Map if you are commanding a P-3, MH-60R helicopter or a FFG. If you are commanding a sub, the track numbers you see on the Nav Map for your Ownship contacts have three digit-alphanumeric assignments. The track is promoted with its four-digit number that is assigned behind the scenes every time you mark a contact. These numbers follow the same format as the surface and air contacts. The numbers are sequential based on your platform ID. All Link participants see the same four-digit number for your promoted contact. The promoted contact number appears in parentheses after the time of promotion in the 'Promoted' field in the DDI when you select that contact. See *Navigation Station/2D Navigation Map/ Contact Designations (Contact/Track IDs)/Contact IDs When Ownship is a Submarine*.

**Multi-Station Mode:** Any member of the crew on a Multi-Station platform can promote a contact to the Link. All players on the same platform share the same Platform ID.

- ✓ Note: The Link is modeled for all countries with controllable platforms in S.C.S. - *Dangerous Waters*. Any controllable platforms in a multiplayer mission that are assigned the same side during mission creation are part of that side's Link. If a mission is created that assigns Chinese, Russian and U.S. controllable platforms to the same side, all of those platforms are part of the same Link in that mission.

## To Promote a Contact

1. Classify the contact to the best of your knowledge; create a TMA solution for the contact if possible.
2. If you are commanding a submarine, come to communications depth (comms depth) maintain a speed of 10 knots or less, then raise the Radio Mast. (Comms depth varies by submarine. See *Appendix C: Submarine Max & Mins* for depth and speed information for safely raising the Radio Mast in your specific submarine class.)
3. Select the contact you want to share with the Link, then right-click on it to display the Contact Menu.
4. From the Contact Menu, select **Promote To Link**. The **Promote to Link** option is only available on contacts marked by your own sensors.

It does not appear for AI or player-promoted Link contacts.  
(Submarines can only promote a contact to the Link if they are at comms depth with the Radio Mast extended. Until those conditions are met, the menu option is not visible.)

- ❑ When the contact is successfully promoted to the Link a new field labeled Promoted: appears in the DDI when the promoted contact is selected. The time in game at which the contact was promoted (or updated) appears in this field.
- ❑ You will have no other indication in a single player game that your contact has been promoted.
- ❑ See Multiplayer Mode above for information on promoted track numbers in a Multiplayer game.

### **Updating Data for a Promoted Contact**

When you promote a contact to the link, you also promote any available solution data you have for that contact. Solution data is entered from the TMA Station (subs and FFG only) and is also provided by your lookouts. The contact symbol for your promoted contact appears at the appropriate location on Nav Maps (and Geoplots) of your Link Participant players. The contact moves on the map on the course and speed contained in the solution you entered for the contact until you update it. If no TMA solution data is promoted, as with a manual solution, the symbol does not move on the map.

While your local contact may be constantly updated by your lookout or in the TMA plot, the solution for the contact you promoted to the Link is not automatically updated with your new TMA solution on the screens of your Link participant players. If you have refined your TMA solution or you notice that your lookout is placing the contact on a new course, select the contact again then select **Promote to Link** again. This sends your updated position data to your Link participants. The time of the update replaces the previous time in the “**Promoted**” field in the DDI.

## **OWNSHIP MENU**

Right-clicking on the selected Ownship symbol on the Nav Map displays a set of options specific to Ownship. Ownship and Orders Menu options are nearly identical and vary by platform type.

The Orders/Ownship Menu options that are unique are covered in each platform's Stations section in the *Task Bar/Orders Menu* portion of the manual. The Ownship Menu has several options that require the use of the Nav Map and are not available in the Orders Menu. The following Ownship Menu items are the same from platform to platform.

**Navigate:** The following menu items appear only in the Ownship Menu, in all platforms.

**Enter Waypoints (Enter Fly-to Waypoints):** Select this option and click the Nav Map to add waypoints to the map. Continue to click to add new waypoints. Right-click the Nav Map or press [End] to stop

adding waypoints. A submarine, FFG and P-3C Ownship will continue along the same course once the last waypoint is reached. The Helo Ownship speeds up between waypoints then hovers when the last waypoint is reached (unless you have added alternate speed instructions to the last waypoint via the Waypoint Properties dialog.)

**Remove Waypoints:** This menu option only appears when waypoints have been added to the Nav Map. Select this option to remove all OS Waypoints from the map.

**Hide/Show Waypoints:** This menu option only appears when waypoints have been added to the Nav Map. Select the Hide Waypoints option to hide all OS Waypoints on the map. When waypoints are hidden the Show Waypoints option is activated.

**Follow Waypoints:** This option only appears if waypoints are assigned and you have ordered Ownship on a course that deviates from the waypoint path. Selecting this option orders Ownship to once again follow the waypoints.

**Change Course:** Select this option then click the Nav Map to change OS course to the bearing clicked.

**Show/Hide History:** Select this option to display the track history of Ownship. Dots appear on the Nav Map indicating OS course since the start of the mission. Select Hide History to remove the dot track.

**Platform Reference:** Select this option to display the USNI Browser Reference for Ownship. Click OK in the USNI Browser to close the browser and return to the Nav Map.

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## DIGITAL DATA INDICATOR (DDI)

The Digital Data Indicator (DDI) provides information about the contact selected on the Nav Map. The number of fields in the DDI depends on the selected contact and whether or not the symbol represents a solution or Truth. Truth shows the actual position of the contact on the Nav Map and the true class of the contact is displayed in the DDI. Truth is considered a cheat. When Show Allies is on, all members of Ownside and its allies appear in their actual locations as Truth objects. See *Main Menu/Options/Game>Show Truth* and *Show Allies* for more information.

When you, your TMA Autocrew or the Link participants enter or report a solution for a contact, the solution fields of the DDI contain data when that contact's symbol is selected. The solution section contains the current firing solution that is used by Ownship's weapons system when targeting the selected contact. When a submarine or the FFG is Ownship, the firing solution is set when you enter a solution from the TMA station. (See *Training/TMA Basics* or *TMA Station* for the desired platform. The Link participant that reports the contact also provides solution data.

Bear in mind that the information in the DDI is only as accurate as the classification and TMA solution you or your Autocrew have entered for Ownship detected contacts. It represents your current 'best guess' about

the selected contact. Link reported contacts have a high degree of accuracy. (The P-3 and the MH-60R have no TMA station.) Solutions provided by the AI Link are fairly accurate.

When a solution contact is selected on the 2D Nav Map the following information is available:

**Contact:** Displays the Contact ID (Track ID) number: S01, R01, E01, V01 etc. (subs) or a four-digit number for contacts reported by the FFG, Link, and aircraft.

**ID:** Displays presumed alliance: Friendly, Hostile, or Neutral as designated by you or the Link or your Autocrew.

**Category:** Displays the reported or assigned platform category: Surface, Submarine, Air, Stationary (land contacts) etc.

**Class:** Displays the specific ship or aircraft class as designated by you, your Autocrew or the Link reporter.

**Confidence:** Displays the current level of confidence in the classification as designated by you, your Autocrew or the Link reporter.

**SOLUTION:** The information in the three rows of the solution section represents the last solution entered in TMA station by you or your TMA Auto Crewman or the reporting Link Participant. These fields are blank until a solution has been entered in TMA.

**Bearing:** Displays the bearing to the contact as designated in the TMA solution or reported by the Link.

**Range:** Displays the current estimate of the range to the contact.

**Course:** Displays the estimated course of the contact.

**Speed:** Displays the estimated speed of the contact.

**Bearing Error:** The average of the bearing error that is displayed in the TMA dot stack.

**Bearing Rate:** Represents the change in contact bearing over time. A high bearing rate could indicate that the contact is close. The contact could also be farther away but moving very rapidly. An L or R (for left and right) precedes the bearing rate number. If looking down the line of bearing, an L means that the contact is moving to the left, R means that it is moving to the right.

**Promoted:** This field only appears when the selected contact has been promoted to the Link. The time of promotion displays in this field. The Promote to Link option in the Contact Menu is a means of sharing your contacts with all other Ownside platforms in the area. It is especially useful during multiplayer missions. When you promote a contact when a submarine is Ownship, the three-character alphanumeric contact ID is not viewed by other players. Instead a 4-digit Contact ID is assigned to the contact based on your hull number and this number appears in parentheses after the time of promotion. Other players see the 4-digit number beside the promoted contact's symbol. If you update a contact by selecting it and promoting it again, the time of the update is seen here.

**Age:** Displays the amount of time that has passed since the last report from the Source sensor.

**Source(s):** Displays sensor input for this contact. When the source is a Link participant, the track ID of the detecting platform appears in parenthesis.

- ✓ **Note:** When Show Truth is on, the DDI displays the selected contact's actual name, class, course, speed, altitude/depth and percentage damage.

## 3D VIEW

The 3D View contains a 3D representation of the contact currently hooked (selected) on the 2D Nav Map. What appears in the 3D View depends on how far along you are in the contact classification process.

### WIRE FRAMES

Contacts detected by some of Ownship sensors display on the 3D View as wire frames of varying shapes when the contact symbol is selected in the Nav Map.

**Sphere:** Until a contact is assigned a category or class it appears as a wire-frame ball – an Area of Uncertainty (AOU) – in the 3D view. This indicates only that something has been detected in this area.

**Generic Sub, Ship, or Aircraft:** When you designate a category for the selected contact using the Contact Menu's *Designate Category/ID >Category* or *Classify Contact* option, a generic model of the selected platform type is seen in the 3D View.

**“Box Corners”:** When you assign an alliance ID to a contact using the Contact Menu's *Designate Category/ID >ID* or *Classify Contact* option, “box corners” of the color representing the assigned alliance surround the model.

### 3D MODELS

Until a specific classification has been assigned to a contact, no specific 3D model can be displayed. As soon as a contact is classified as a specific class of ship or aircraft, the 3D View displays the 3D model in use for the specified class. Contacts reported by the AI Link participants usually include a classification; therefore these contacts usually display a 3D model of a specific class when a Link contact is selected. Ownship and Link participants never appear as wire frames.

For solutions created in the FFG or submarine TMA station, the location of the Nav Map symbol and the 3D object coincides with the location of your TMA solution. That location is only as accurate as your TMA assessment. Be aware that if your classification (or the classification provided by your Autocrew) is incorrect, the model shown will be of the incorrect assignment. If the Link participant classifies a contact as one category or class and you classify it as another, both 3D models will be present in the 3D view for that

contact. If you agree fairly precisely on the location of a contact the 3D models may overlap.

When Show Truth is off, what appears in the 2D Nav Map and 3D view represent solutions. Solutions are your best guess as to the identity and location, course and speed of a contact. When Show Link is ON Link participants also provide solution data. The Ownship FFG Lookout and the Aircraft spotters provide solution data on contacts they detect visually. Models for solutions have no wakes in 3D view.

3D View is on by default in the small retractable window in the upper right of the Nav Station. Purists may wish to turn off 3D in the Nav Screen. See *Navigation Station/3D View/Disabling and Hiding 3D*.

**Note:** 3D weapon models appear only on Ownship's 3D model.

## CONFIDENCE INDICATOR

Above the 3D model is a Confidence Indicator denoting the level of confidence placed in the assigned classification and/or solution information. The color of the chevrons and associated text indicate the level of confidence you have in your classification or categorization of the contact. For contacts you classify yourself the default confidence level is LOW. Frequently the Link participants report a high level of confidence in their assessment.

- ⇒ To change the Confidence Indicator, select the contact then right-click to display the Contact Menu. Select *Designate Category/ID>Confidence* or select *Classify Contact...* and select the desired level of confidence (Low, Medium or High)

✓ **Note:** When Show Truth is on, the Confidence Indicators are not shown. Ownship never displays a confidence Indicator.

## 3D VIEW CONTROLS

The position of the 3D View and the 2D Map can be switched to provide a larger 3D view.

- ⇒ Press [Ctrl] + [M] to swap the position of the 2D Map and the 3D view.

Or click the swap window button next to the up arrow in the upper right corner of the Navigation Station.

Use these keys adjust the 3D view.

- ⇒ Click the 3D model and drag the mouse to rotate the angle of your view.
- ⇒ Press [Ctrl] and click and drag or use the mouse wheel to zoom in and out.

- ⇒ Press [Ctrl] + [+]: to zoom in on the selected object or last camera position if nothing is selected in the 2D Map
- ⇒ Press [Ctrl] + [-]: to zoom out on the selected object or last camera position if nothing is selected in the 2D Map.
- ⇒ Press [Ctrl] + the arrow keys to rotate the camera around and above and below the selected model.

## DISABLING AND HIDING 3D

Some game purists may prefer to disable the Nav Map 3D View completely. This is done prior to game start on the *Options>3D* page. You can also hide 3D from within the game without disabling it completely. A 3D view is always visible from the Pilot Station in the aircraft, the FFG Bridge and Machine Gun View, and from the Sail Bridge and the Periscope Stations in the submarines.

- ⇒ Press [Ctrl]+ [A] to hide the small window. Since 2D and 3D can be swapped, whichever view is in the small window is hidden.
- ⇒ Or click the up arrow in upper right of the Navigation Station to hide the small window. The arrow changes to a down arrow. Click the small down arrow to display the small window again.

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## PLAYING FROM THE NAV

With all of your Autocrew activated and Show Link Data selected it is possible to play many aspects of the game from the Navigation Station. Using a combination of voice and menu commands you can navigate, track, classify and attack enemy ships, launch Special Forces (subs only), and read your message traffic. You must still visit the other stations to perform some tasks.

## ATTACKING TARGETS FROM NAV

When a hostile, neutral, or unknown surface, submarine or air contact symbol is present on the Nav Map, it can be attacked using the Contact Menu. When a submarine is Ownship, surface and submarine contacts can also be attacked using the Fire Tube command in the Orders and Ownship Menus. All of these menus are only available when certain parameters are met.

- ❑ Contacts designated as belonging to Ownside or contacts from sides designated as Allied when the mission is created have no **Engage With** menu. Ownside contacts are blue; symbols for Allied contacts are orange in color.
- ❑ The **Engage With** menu does not appear for symbols that have no category (sub, surface, air, stationary) assigned. The system must know what category (type) of platform is selected to determine the appropriate weapons to display. (The game does not allow you to fire a torpedo at an aircraft.)

## **Using the Contact Menu:**

1. Click on the symbol of a hostile, neutral or unknown sub, surface or air contact to select it then right-click on the symbol to display the Contact Menu.
2. Select **Engage With**. A submenu of weapons appropriate for the target is displayed.
  - ❑ If you have no weapon appropriate for the target, the Engage With option is unavailable.
  - ❑ If the parameters for firing a weapon have not been met, the menu option is greyed. See information on specific weapon parameters in the Stations section for the desired platform in the Fire Control Suite (subs), FFG Weapons Control or FFG Torpedo Control Stations, P-3C TACCO Station or MH-60R ATO Station.
3. Select the desired weapon to fire it at the selected target.
  - ❑ If the Fire Control Autocrew is ON, presets are entered for the weapon based on the firing solution information and the platform classification.
  - ❑ If the Fire Control Autocrew is OFF, weapons fired from the Nav Station use the default weapon settings.

## **Using the Orders or Ownship Menu**

When a submarine is Ownship an additional method of attacking a pre-selected contact with a torpedo is available in the Orders or Ownship Menu.

**Fire Tube:** If you have assigned a target to a torpedo tube in the Fire Control Launch Panel (subs) or the FFG Torpedo Control Station, this menu option is available on the Orders and Ownship Menus. If no target is assigned to a tube, this option is unavailable.

⇒ Select the desired tube to fire the weapon at the target assigned to that tube in the Fire Control Station's Target Display.

✓ **Note:** UUV sensors do not require a target so they can be launched at any time if they are loaded in a tube. Be aware that OS speed must be 4 knots or less for a successful launch of a UUV sensor. The UUV has a max speed of 5 knots. If the ship collides with the UUV the UUV is destroyed.

## **OWNSHIP WAYPOINTS**

Sometimes it is nice to ensure that your platform steers the desired course without your constant attention. Placing waypoints on the map automatically activates the Auto helmsman or Autopilot. In the subs and the FFG this is not a crewman that you turn on and off, he is automatically on as soon as waypoints are entered. The Auto Pilot in the P-3C and MH-60R is a selectable option and performs as described in the *P-3C Stations/Pilot*

*Station and MH-60R Stations/Pilot Station.* (The Auto Pilot is always on if you are not on the Pilot Station.)

- ✓ **Note:** The Auto Helmsman or Auto Pilot follow the waypoints as soon as they are placed on the Nav map and follow them until you order a course change by some other means. To resume following the waypoints select the Ownship Symbol on the Nav Map or the Orders Menu and select *Navigate>Follow Waypoints*.

**FFG and Subs:** Place waypoints through a tricky strait, around islands or set them to take you toward a specific destination.

**P-3C/MH-60R:** Waypoints are useful for creating a search pattern. If traveling over land, the autopilot automatically adjusts the altitude as needed, always returning to the original ordered altitude when possible. When the last waypoint is reached the P-3C continues on the same course. The MH-60R speeds up between waypoints then hovers over the location of the last waypoint (unless you have added alternate speed instructions to the last waypoint via the Waypoint Properties dialog.) When you are extremely busy you might want to set the aircraft to follow a waypoint loop. See *To Add a Waypoint Loop* below.

### **To Place a Waypoint on the Nav Map**

1. Press [Insert] or select Add Waypoint from the Ownship Menu.
2. Click the map to place a waypoint.
3. Continue to click the map until the desired waypoints have been placed.
4. Right-click the map or press [END] to stop the process.

### **To Add a Single Waypoint**

- ⇒ Press [Ctrl] + [Insert] then click the map to inset a single waypoint is added after Ownship.
- ⇒ Press [Alt] + [Insert] to add a single waypoint after the last waypoint
- ⇒ Press [Shift] + [Insert] to add a waypoint after a selected waypoint. If no waypoint is selected, the waypoint is added after the last waypoint.

### **To Add a Waypoint Loop**

1. Layout the waypoints as usual using [Insert] or [Ctrl] + [Insert] or an Ownship Menu command. Right-click or press [End] to place the last waypoint.
2. To create a loop from the last waypoint to another existing waypoint, select the last waypoint then press [Alt] + [Insert] and continue to hold down [Alt] as you click on or near the waypoint you would like Ownship to loop back to once it reaches the last normally placed waypoint

- ❑ The line to this point disappears so there is no indication that the waypoint path will loop.
- ❑ The loop point does not have to be the first waypoint. You can lay out a set of points to transit to an area you want to loop around.
- ❑ When you reach the first waypoint in the loop, it will be cycled around to the end of the waypoint path instead of being deleted. The display will update properly to reflect the new ending segment.
- ❑ Loop waypoints can be deleted or moved as normal waypoints. You can insert a single waypoint in between looped waypoints but they will not be added to the cycled loop. Ownship will detour off to the inserted point but the new waypoint will be deleted when it is reached. To add new loop points, you must create a new loop.

## **Some Restrictions**

- ❑ Waypoints cannot be added or moved over land or water too shallow for a submarine if OS is a sub.
- ❑ Waypoints cannot be added or moved in such a way as the direct path to the previous or next waypoint crosses land or water too shallow for a ship or submarine.

## **Applying Waypoint Properties**

You can fine tune the precise location of a waypoint and set a specific speed, and/or depth or altitude change for Ownship (depending on the platform) from the Waypoint properties dialog.

1. Double-click on a waypoint to open the Waypoint Properties dialog.
2. Click or right-click on the digits to set the precise latitude and/or longitude coordinates for the selected waypoint.
3. Select the desired compass heading from the drop-down list.
4. **Speed/Depth/Altitude:** Click/right-click the digits to enter the desired change for Ownship to implement upon reaching the waypoint.

## **VOICE COMMANDS**

There are a variety of voice commands available during gameplay if you installed the speech recognition software when you installed S.C.S. - *Dangerous Waters*. Voice commands behave similarly to their available keyboard or menu option counterparts and can only be used where the keyboard or orders command is appropriate (e.g., they are ignored when dialogs are visible). Voice commands are only recognized during gameplay.

You can train your speech engine by visiting the speech control panel accessed via the Speech icon in the Windows 98, Windows 2000, Windows ME, or Windows XP control panel. You can also improve the accuracy of the speech engine by adjusting the accuracy vs. performance slider in the speech control panel.

- ✓ **Notes:** The speech recognition software is not compatible with Windows 95. If you attempt to install the game on a Windows 95 platform, the option to install the speech recognition software is not seen.
- ✓ The document *Voice Commands.doc* contains a list of voice commands recognized by the game and resides on the CD in the *Manual* folder. The Microsoft's Speech Recognition Engine 5.1 resides on *S.C.S. - Dangerous Waters* CD1 in the *MSSpeech* folder if you choose to install it manually.

## Using Voice Commands

1. Select *Options>Sound*.
2. Under the Speech heading select Enabled and, if desired, Always On. Always On is only available when Enabled is checked.

- ✓ **Note:** Both options are greyed if you do not have a speech engine installed.

When ENABLED ONLY is selected on the *Options>Sound* page:

- ⇒ Press and hold the speech key while issuing a valid voice commands. By default the speech key is [W].
- When the designated speech key is pressed during gameplay, voice recognition is listening and the speech engine interprets anything you say. When this key is released, voice recognition is not listening and it ignores anything you say.

When ALWAYS ON is selected on the *Options>Sound* page:

- ⇒ Issue a valid voice command as desired at any point during gameplay.
- When the Always On option is checked, the designated speech key is ignored and the speech engine is always listening to what you say.



# *SECTION 7*

# *FFG STATIONS*



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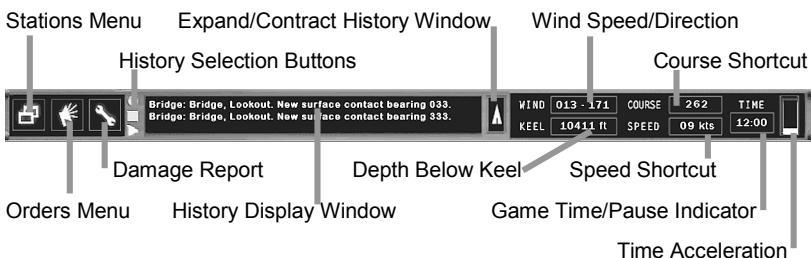
## 7: FFG STATIONS

The Oliver Hazard Perry (FFG 7) class surface ship is modeled in S.C.S. – *Dangerous Waters*. Referred to simply as the FFG in this manual, its stations are described and explained in this section.

- ✓ **Note:** The default view when entering a mission is the Navigation Station. The Navigation Station with its 2D Nav Map and 3D view functions the same on every controllable platform and is covered only once in the manual. See *Navigation Station*. Some Nav Station information unique to the FFG is contained in the abbreviated *FFG Navigation Station* section later in this section.

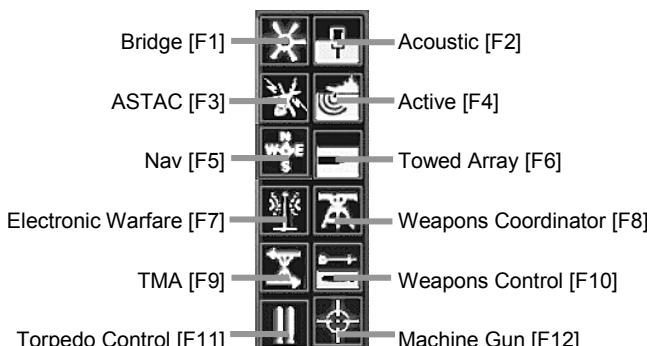
### FFG TASK BAR

The task bar is similar for all platforms but there are a few features unique to the FFG. The FFG Task Bar menus, windows, readouts and maneuver shortcuts are described here.



### STATIONS MENU

Click the Stations Menu button to expand the Station selection menu. Select an icon to jump to that station.



## ORDERS MENU

The Orders Menu and the Ownship Menu contain the same options. To reveal the Ownship Menu click on the Ownship NTDS symbol on the Nav Map, the right-click on the selected symbol. These menu options are described below:

**Navigate:** Displays a submenu of navigation options.

**Order Rudder:** Displays a submenu of rudder commands. In addition to the numbered commands the following selections set these rudder positions.

Standard (Left /Right): Orders 15 Degrees

Full (Left/Right): Orders 20 degrees

Hard (Left/Right): Orders rudder to max (right or left) position.

**Change Speed:** Displays a submenu of engine order options.

Selecting an option sets a preordained number of engine revolutions. The resultant ship speed will depend on seastate, wind and current.

In a calm sea with wind and currents turned off, these settings result in the following speeds:

Engines Ahead Flank: 29 knots

Engines Ahead Full: 20 knots

Engines Ahead Standard: 15 knots

Engines Ahead 2/3: 10 knots

Engines Ahead 1/3: 5 knots

Engines All Stop: zero knots

Engines Back1/3: 3 knots

Engines Back 2/3: Reverse speed of 5 knots

Engines Back Full: Reverse speed of 10 knots

✓ **Note:** Backing up when the Towed Array is deployed cuts the array.

**Autocrew:** Displays a submenu of all FFG Autocrew. A checkmark indicates the option is ON. Select the object to toggle its state.

**Auto-Countermeasures:** When ON chaff and flare countermeasures are launched when appropriate. This slider button for this for this Autocrew is located in the Bridge Station.

**Acoustic/Sonobuoys:** When ON, the Autocrew sets sonobuoys to directional mode and marks contacts in the FFG's Acoustic Station.

**EW:** When ON, the Autocrew marks contacts in the Electronic Warfare Station. Autocrew does not classify EW contacts. You must do that yourself.

**Towed Array:** When ON, the Autocrew marks broadband contacts in the Broadband Towed Array Station.

**TMA:** When ON, this Autocrew merges contacts and creates firing solutions for contacts in the Track list in the TMA station. You are prevented from dragging the ruler when TMA Autocrew is ON

**Torpedo Control:** When ON Torpedo Autocrew enters presets appropriate for the selected target.

- ✓ **Note:** The FFG follows waypoints when they are added to the Nav Map. Waypoints act as an Auto-helmsman even though there is no separate Autocrew for this function. When waypoints are added the FFG follows the waypoints until you order a different course. The waypoints remain and selecting Follow Waypoints from the Ownship or Orders Menu will once again return the ship to the designated waypoint course.

**Sensors:** Selecting this option displays a submenu of the FFG 's sensors.

**Towed Array:** Select this option to display the Towed Array Options:

Stream: Select this option to stream the Towed Array.

Retrieve: Select this option to retrieve the Towed Array.

Stop: Select this option to stop streaming or retrieving the towed array at its current length.

**Surface Radar:** Select this option to toggle the state of the Surface Search Radar. A check mark indicates the radar is ON.

**Air Radar:** Select this option to toggle the state of the Air Search Radar. A checkmark indicates the radar is ON.

**Secure All:** Select this option to turn off all radars and retrieve the towed array.

**Flight Deck:** Selection of this option displays a submenu of Flight Deck options. A checkmark indicates the option is selected.

**Green Deck:** When selected, Ownship's helicopter can be launched or retrieved.

**Red Deck:** When selected, Ownship's helicopters can neither land nor launch.

**Countermeasures:** Selection displays a submenu of countermeasure options. The number in parentheses indicates the remaining number of countermeasures of that type. Chaff and Infrared flares are used to confuse incoming missiles.

**Port or Starboard Chaff:** Select an available option to launch chaff. Items are greyed if all tubes on the indicated side are empty. Reload tubes at the Bridge Countermeasure panel. You must reload chaff before the option is reactivated.

**Port or starboard Flares:** Select an available option to launch a flare. Items are greyed if all tubes on the indicated side are empty. Reload

tubes at the Bridge Countermeasure panel. You must reload flares before the option is reactivated.

**Nixie Torpedo Decoy:** Selecting this option displays controls for deploying the towed torpedo decoy.

Stream: Select to start streaming the cable.

Retrieve: Select to retrieve the cable.

Stop: Select to stop streaming or deploying the Nixie cable. It is best to keep the decoy as far from Ownship as possible.

**OTS Sonobuoys:** Displays a submenu of available sonobuoys. The number of remaining buoys of each type follows the buoy name. Select a buoy name to deploy a buoy of that type and depth. Only one type of Buoy is available at a time. Switch to a different type of buoy at the ASTAC/OTS Buoy Panel. If no buoy is loaded in the OTS Buoy Panel, all options are grey.

[Buoy name] Shallow = 90 feet

[Buoy name] Deep = 400 feet

**CIWS:** Selection of this option displays menu controls for the Phalanx Close In Weapons System (CIWS). A checkmark indicates that option is currently selected. From this menu you can place the CIWS in Auto, Full Auto or Hold Fire. You must be at the Weapons Control CIWS Panel to acquire and engage a contact manually.

**Hold Fire:** Select to stop the CIWS when firing or to prevent the CIWS from firing.

**Auto:** Select to set the CIWS in Auto mode. In AUTO mode the CIWS automatically engages incoming tracks with speed in excess of 200 knots.

**Full Auto:** Select to set CIWS to Full Auto Mode. In full Auto mode the CIWS automatically engages any track within range of the CIWS Radar. (This includes friendly platforms.)

## DAMAGE REPORT WINDOW

The Damage Report Window lists damage that occurs at any station. Some damage is repaired over time. When damage is repaired a message appears here. An audible voice message may also be heard. Each entry lists the time in the mission when the damage occurred, the type of damage and an estimate of time until the damage is repaired or an indication that the damage cannot be repaired. If damage is severe it cannot be repaired during the course of a mission.

⇒ Click the wrench button in the Task Bar to open/close the window.

## HISTORY WINDOW

Displays the type of history selected by buttons to the left of the window.

**History Selection Buttons:** A lit button indicates the currently selected History type. If there is a new message in any other history type, that type's selection button flashes until that button is selected.



— Crew Report History: Lists all orders as acknowledged by crewmembers.

— Radio Traffic History: Lists all radio messages received. The original mission tasking is also seen here.

— Multiplayer Chat History: Displays a history of multiplayer chat messages.

## MANEUVER SHORTCUTS AND GAME READOUTS

**WIND:** Readout of Wind Speed and Direction. Values other than zero appear here only when the mission designer has created a Wind Region in the current mission *and* Enable Wind is selected in *Options>Game* prior to the start of the mission.

**KEEL:** Readout of depth below the keel.

**SPEED:** In knots. Maneuver Shortcut--Click or right-click digits to change speed to the value entered.

**COURSE:** In degrees. Maneuver Shortcut--Click or right-click digits to change course to the value entered.

- ✓ **Note:** Be aware that wind and currents affect Ownship course and speed. It may not be possible to achieve the ordered course or speed if the wind and currents are strong. Wind and currents can be turned off/on in the *Options>Game* page prior to mission start.

**TIME:** Displays the time of day in the mission based on a 24-hour clock. When the game is paused, the time display is replaced by the word PAUSED.

- ⇒ Press [P] to pause the game. Press [P] again to resume the game.
- ⇒ Click the numbers in the Time display to pause the game. Click PAUSED in the time display to restart the game.

## TIME COMPRESSION SCALE

In addition to real time, S.C.S. - *Dangerous Waters* supports four levels of time compression. The time scale displays in the far right of the Task Bar. A stack of colored bars represents the level of time compression.

- At real time, a single green bar is displayed.
- At twice real time a lime (yellow/green) bar appears above the green bar.
- At four times real time a yellow bar is added to the stack.
- At eight times real time an orange bar is added.

- At up to sixteen times real time (depending on system capability) a red bar appears at the top of the stack.
  - Press [.] or [.] or click/right-click on the scale to toggle through all the time scales

✓ **NOTE:** Time compression is not available in Multiplayer missions.

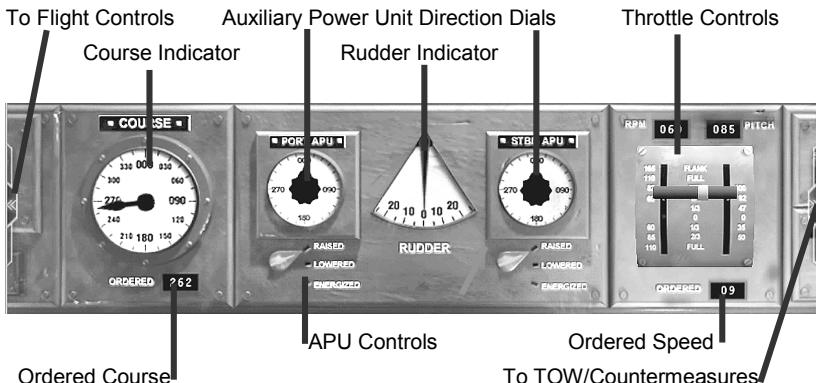
## FFG BRIDGE [F1]

The Bridge consists of five areas: Ship Handling, Flight Conditions, TOW/Countermeasures, and the Port and Starboard Bridge Wings where binoculars are located. The default view on entering the Bridge is the Ship Handling console. Some ship handling capability is retained regardless of which portion of the Bridge is accessed.

- Click the transition button at the edge of the console to move to the indicated console or wing section of the Bridge.

### SHIP HANDLING

The ship's course and speed are controlled from this portion of the bridge console.



#### *Bridge: Ship Handling*

**Course Indicator:** In the Course Indicator the orange needle indicates the current course. The black needle indicates the ordered course.

- To order a new course heading, click the desired bearing on the Course Indicator dial.

**Digital Ordered Course Readout:** The digital ordered course readout displays the course currently ordered in the Task Bar or the Course Indicator.

- To order a new course in the Digital Ordered Course Readout, click on a digit to increment the number; right-click to decrement it.

**Port and Starboard APUs:** The Auxiliary Power Units (APUs) are small electric propellers used for fine steering control when making a pier landing or getting underway. Each unit can be individually raised, lowered, and energized by the mechanical rotary switches and the propellers can be oriented in any azimuth by means of the direction dials. An APU is lowered as needed and the directional dial is used to aim the propeller in the desired direction. The arrow on the directional dial points in the direction of thrust.

To use APUs:

1. Reduce ship's speed to 5 knots or less before lowering the APU.
2. Click the desired text to move the rotary switch to that position.
3. Click the Direction Dial to indicate the desired direction of thrust for that unit.
4. Energize the desired unit. (The motor cannot be turned on until the motor is lowered.) Raising the motor turns it off.
5. Click the Direction Dial as needed to fine-tune the ship's movement.
6. Make sure to raise the unit before increasing speed beyond 5 knots.

**Rudder Indicator:** When a course change is initiated by means of the task bar or the course dial, the rudder indicator moves accordingly. If preferred, the rudder indicator can be used directly to change course.

- ⇒ Click the desired number in the Rudder Indicator to order a Rudder change. The black needle indicates the ordered rudder position and orange the actual position.
- ⇒ Click 0 in the Rudder indicator or click in the Course Indicator to reset the rudder.

**Throttle:** The throttle control levers control engine rpm and propeller pitch. Adjusting the RPMs affects Ownship speed. Setting a negative pitch slows Ownship and eventually causes OS to back up.

- ⇒ Click and drag on a lever to move both sides of the throttle in unison.
- ⇒ Right-click on a throttle lever to move it independently.

## FLIGHT CONDITIONS

The Flight Conditions portion of the Bridge Console is accessed by clicking the transition button at the left edge of the Ship Handling console or on the right side of the console when on the Port Bridge Wing. The Course Indicator, Port APU and Rudder Indicator remain visible when viewing the Flight Controls.



### Bridge: Flight Conditions

**WIND ENVELOPE:** The Wind Envelope display is used to determine when wind conditions are acceptable for helicopter landing and takeoff operations. Each line, or ring, in the wind envelope represent 5 knots of wind. The red needle indicates the relative wind direction. When the needle is outside the envelope, helicopter operations (helo ops) cannot be conducted safely. The slightly smaller shaded area shows the envelope for night ops. There are no conditions under which flight ops can be conducted safely when relative wind speed is in excess of 45 knots.

Below the Wind Envelope is a digital readout of the relative wind direction and speed.

- ⇒ If the red needle is outside the wind envelope, turn the ship until the needle position indicates a safe condition for helo operations.

**PITCH AND ROLL:** The ship pitches and rolls depending on the sea state. When the pitch exceeds 5 degrees and/or roll exceeds 10 degrees, flight operations cannot be conducted safely. View the pitch and roll bubble indicators to help determine if it is safe to set Green Deck.

- ✓ **Note:** Wind Envelope and Pitch and Roll are only activated when Enable Wind and Enable Currents are selected in the *Options>Game* screen. These options are not available once the mission has started. They must be set prior to loading the mission.

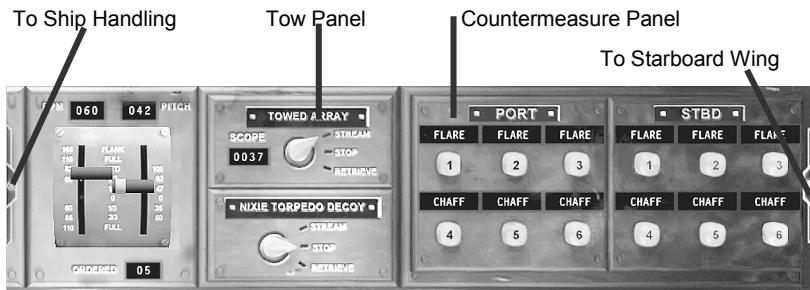
**GREEN DECK / RED DECK (Flight Deck Status):** A flight deck status of Red Deck indicates unsafe flight conditions or that all preparations for helicopter operations (helo ops) have not yet been met. Set Green Deck when all conditions indicate helo ops can be conducted safely.

- ⇒ Click GREEN DECK to permit the helicopter to launch or land.
- ⇒ Be sure to check the weapons control station to ensure that CIWS is not in Full Auto mode. The CIWS will take out the helo as soon as it launches if CIWS is in Full Auto mode

**Tip:** The helicopter LAUNCH command is not available until Green Deck is set. Likewise the helo will not land until Green Deck is set.

## Tow / Countermeasures

The Tow and Countermeasures Console consists of the Tow Panel and the Countermeasure Panel. Access to the Starboard Bridge Wings is found at the far right of the Countermeasure Panel. The throttle portion of the Ship Handling Console remains visible.



**Bridge: Tow and Countermeasure Console**

**The Tow Panel:** The Tow Panel contains switches to stream and retrieve the Towed Array and the towed Nixie Torpedo Decoy. The towed array panel also contains a digital readout of the scope (length) of towline currently deployed.

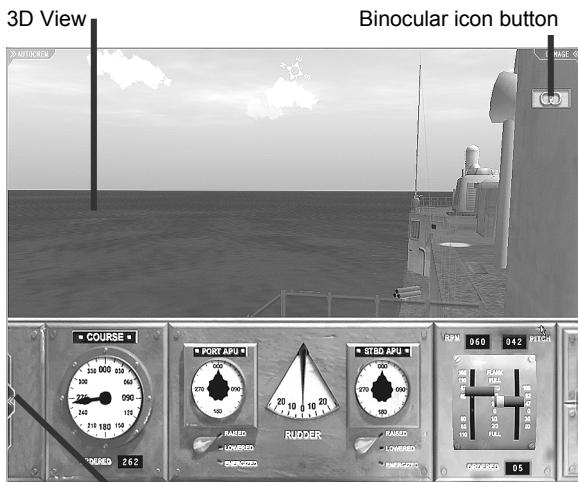
- ⇒ Click the text of the desired action to move the switch to that position. (The arrays can also be streamed and retrieved from the Orders and Ownship Menus.)
- The Nixie Torpedo Decoy is a noisemaker dragged far behind the ship. It should be deployed only when there is a torpedo in the water.
- Backing up when the towed array and/or towed Nixie are deployed will sever the towline.

**Countermeasure Panel:** The Countermeasures Panel contains pushbuttons to launch and reload tubes in the countermeasure launchers. An illuminated button indicates that tube is ready for launch. The button is dark when the tube is empty, and blinks while it is being reloaded. The window above each button displays what is loaded (or currently being loaded) in the tube.

- ⇒ Click the text in a window to cycle through the countermeasures available for reload in that tube or to change the current loadout to a different countermeasure. Chaff and Infrared Flares are available.
- ⇒ Click an illuminated button to launch the countermeasure in that tube.

## BRIDGE WINGS/BINOCULARS

A visual scan of the 3D environment is possible from the port and starboard bridge wings. When a contact of interest is located, binoculars provide a closer examination. The binoculars are accessed from either the Port or Starboard Bridge Wings.



Transition button to Bridge

### ***Bridge: Starboard Bridge Wing***

**Bridge Wings:** When on either Bridge Wing the Ship Handling Console panel is available.

- ⇒ Click and drag in the Bridge Wing 3D view to pan in the Free Look view
- ⇒ Click the binocular button at the right of the screen to access the Binoculars.
- ⇒ Click the transition button at the edge of the console to return to the Bridge.

**Binoculars:** The binoculars provide magnification from 2X to 16X. LLTV (Low Light TV) mode is available for night use.

- ⇒ For an enhanced view of a visual contact of interest, click the binocular icon at the right of the Bridge Wing screen to access the Binoculars.
- ⇒ Click and drag in the Binocular view to pan the view. Bearing is relative to Ownship's heading.
- ⇒ Click the plus and minus buttons to increase or decrease magnification.

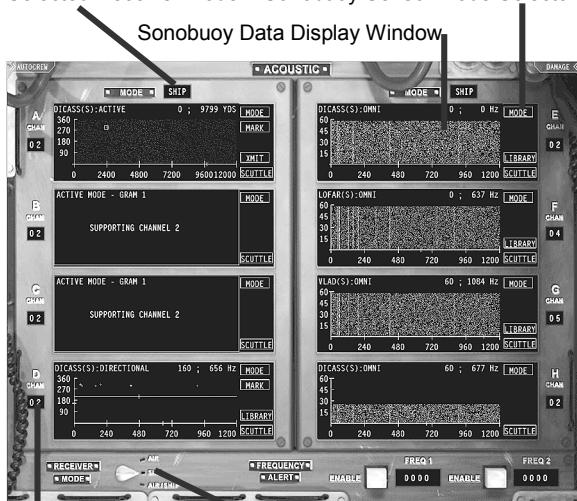
- ⇒ Click the Free Look button in the upper right of the screen to return to Bridge Wing Free Look view.
- ⇒ Click the Transitions button at the edge of the screen to return to the bridge view.

## FFG ACOUSTIC STATION [F2]

In the Acoustic Station incoming data from up to eight sonobuoys is viewed in eight CRT Sonobuoy Data Display Windows (grams). Sonobuoys must be deployed and an appropriate channel selected before any data appear in the Acoustic Data Display Windows. When Acoustic Autocrew is on he sets channels for you.

- ❑ The FFG's Over The Side (OTS) sonobuoys are launched from the ASTAC Station [F3].
- ❑ Your embarked helicopter is launched and ordered to drop sonobuoys from the ASTAC Station [F3].
- ❑ Ownside sonobuoys that are placed in the mission by the mission designer are also available for processing.
- ❑ On the 2D Nav Map, the channel on which a buoy is transmitting appears beside the buoy icon and displays in the Data Display Indicator (DDI) when a buoy symbol is selected.

Selected Receiver Mode   Sonobuoy Sensor Mode Selector



Channel Selector   Platform Receiver Mode Selector

### FFG: Acoustic Station

The Acoustic station labels and hardware are described here. The Sonobuoy Display Window (Gram) functionality is described in

*Training/Sonar School/Sonar Systems/Sonobuoys/Sonobuoy Data Display Windows (Grams).*

**MODE:** The Data Display Windows (grams) in the column below this label show data from sonobuoys within range of Ownship (SHIP) or the deployed Heli (AIR) as selected in Receiver Mode at the bottom of the screen. The selected mode (SHIP or AIR) displays in the readout to the right of the label.

**RECEIVER MODE:** This switch selects which platform's sonobuoy data appear in the data display columns. The selected mode displays in the MODE field at the top of the display windows.

**AIR mode:** All eight channels are reserved to process buoy data sent via Link by your deployed helo.

**SHIP mode:** All eight channels are reserved to process buoy transmissions within range of the FFG's receiver.

**AIR/SHIP mode:** (Default Receiver Mode) Channels A - D are used to process incoming data from the deployed helo, and channels E - H are used for buoy data within range of the FFG's receiver.

**FREQUENCY ALERT:** This feature sets buoys in Omni mode to notify the player when signals matching player-specified frequencies are detected. When enabled, any match received causes an audible alarm and a crew report.

**ENABLE:** Click to begin monitoring for the frequency entered in the Freq 1/Freq 2 fields to the right of the button. The button flashes when the designated frequency is detected.

**FREQ 1/FREQ 2:** Sets a frequency to monitor when the associated Enable button is clicked.

- ⇒ Left or right-click on a digit field to increment or decrement the number to set the frequency of interest.
- ⇒ Click ENABLE to set the system to alert you when the designated frequency is detected. The alert indicates only that the frequency has been detected, not which gram contains the detected frequency.

**CHAN:** Channel to which the associated Data Display Window is set. A sonobuoy transmits data on a specific channel. Click or right-click on a digit to increment or decrement the number.

## **FFG SONOBUOY DATA DISPLAY WINDOWS**

In S.C.S - *Dangerous Waters* the Sonobuoy Data Display Window (Gram display) functionality is identical within platforms with sonobuoy capability. Information on Sonobuoy Data Display Windows and Frequency Alerts is found in *Training/Sonar School/Sonar Systems/Sonobuoy Display Windows (Grams)*. Information specific to the FFG's Acoustic Station is contained in this section.

The FFG's sonobuoy processor can handle 8 different channels of sonobuoy data at once. Buoy data can take up multiple channels depending on the sensor mode (Omni, Directional, or Active) to which the receiver is set.

- The eight channels are designated A-H.
- Only channels A-D can be set to Directional or Active mode.**
- The receiver has 3 modes, set by the rotary switch at bottom left. When **AIR** is selected, all eight channels are reserved to process buoy data sent via Link by your deployed helo. If your helo is not deployed, if you do not have SYNC with the deployed helo, or if the deployed helo's LINK STATUS is set to RADAR, text messages appear in the windows.
- When **SHIP** is selected, all eight channels are reserved to process buoy transmissions within range of the FFG's receiver. Select the appropriate channel to receive data from the desired buoy.
- AIR/SHIP mode:** (Default Receiver Mode) Channels A - D are used to process incoming data from the deployed helo, and channels E - H are used for buoy data within range of the FFG's receiver. Mode labels appear at the top of each bank of displays to show in which mode each bank is set.

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**Tip:** In Air/Ship mode, data received by the ship cannot be processed in Directional or Active mode. If the helo is not sending data, leave Receiver Mode set to SHIP to keep Channels A-D available for Active and Directional processing of transmissions received by the FFG.

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The FFG carries four types of sonobuoys: DICASS (active, directional, and omni modes), DIFAR (directional and omni modes), VLAD (directional and omni modes) and BT (bathythermograph) sonobuoy. It can also tune to LOFAR buoys placed by the mission designer. Buoys are described in greater detail in *Training/Sonar School/Sonar/Sonobuoys*.

## Sonobuoy Modes

Sonobuoys have different sensor detecting and reporting capabilities. Depending on the buoy, up to three modes are available. By default each sonobuoy is set to Omni mode. Clicking the MODE button in the Data Display Window cycles through the available modes. Some modes require supporting displays as noted below. If the required extra displays are not set to channel 00, the mode cannot be switched. (Turn Acoustic Autocrew off before attempting to switch channels to 00 or he will change them back.)

**Omni mode** (Passive) returns received non-directional frequency data. Omni mode is useful for classifying the source of a signal and alerting you to the fact that there is something out there. All sonobuoys (except BTs) default to Omni mode, which requires one channel.

**Directional mode** (Passive) returns received frequencies and bearings and requires two channels. The selected channel must be set to Directional mode in Data Display Windows A – D. There must be one empty window available in either bank of windows to handle supporting data. (One window

displays Directional data received on the selected channel, the supporting window receives OMNI data from the buoy.)

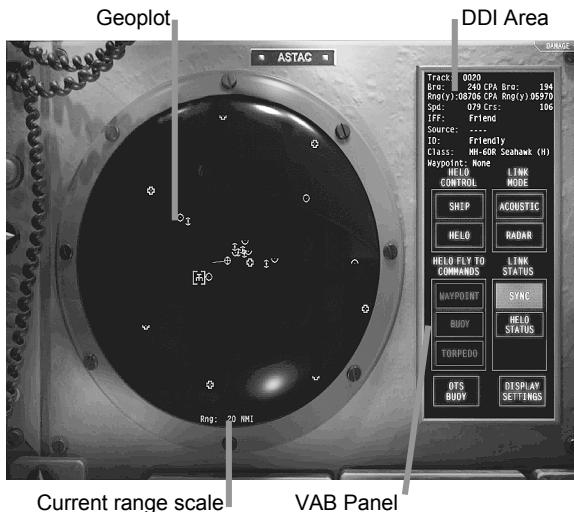
**Active (pinging) mode** returns bearing and range data, and requires three channels. Selected Channel must be set to ACTIVE in Data Display Windows A – D. There must be two empty windows available in either bank of windows to handle supporting data. (One window displays active returns when transmitting, the other two list data relative to the gram display they are supporting.)

If Receiver Mode is set to AIR/SHIP ship sonobuoys can be in Omni mode only. Air data occupies the A – D windows necessary to set Direction and Active modes.

- ✓ **Note:** Sonobuoy Display Window functionality, labels, buttons/VABs and the Library are explained in *Training/Sonar School/Sonar Systems/Sonobuoys*.

## FFG ASTAC STATION [F3]

ASTAC stands for Anti-Submarine/Anti-Surface Warfare Tactical Air Controller. The ASTAC console is used mainly to direct the in-flight helicopter(s) during an ASW search. The ASTAC assigns helicopter fly-to points that designate the helo's course, sonobuoy and/ or weapon drop points.



## ASTAC Station

## GEOPLOT

The Geoplot in ASTAC is used to plot waypoints for the helicopter's flight path, and for sonobuoy and weapon drop locations. Ownship, the deployed

helicopter and all contacts detected by Ownship, the helo and Link participants can be seen on the Geoplot.

**Changing Geoplot Range:** The range scale in the Geoplot can be adjusted to 5, 10, 20, 40, 80 or 120 nautical miles.

- ⇒ [Ctrl] + Left-click in Geoplot zooms in. [Ctrl] + Right-click in Geoplot zooms out.
- ⇒ Mouse wheel forward in Geoplot to zoom in. Mouse wheel backward in Geoplot to zoom out.
- ⇒ Click DISPLAY SETTINGS in VAB Panel and click desired range setting. Click BACK to return to previous VAB Panel.

## ASTAC VAB PANEL

The VAB Panel consists of the upper DDI Area where specific information about a contact hooked in the Geoplot is available and the lower Variable Action Buttons (VABs), which are used to direct helicopter operations.

✓ **Note:** Green text indicates a selected button.

### **Digital Display Indicator (DDI) Area**

The following information on a contact selected in the ASTAC Geoplot is available in the DDI.

**Track:** Track number of the selected contact

**Brg:** True bearing from Ownship.

**Rng (yd):** Range (in yards) from Ownship.

**Spd:** Speed in knots

**IFF:** Identification Friend or Foe. Aircraft only are identified as Civilian, Friendly or Unknown.

**Source:** The sensor source reporting the selected contact.

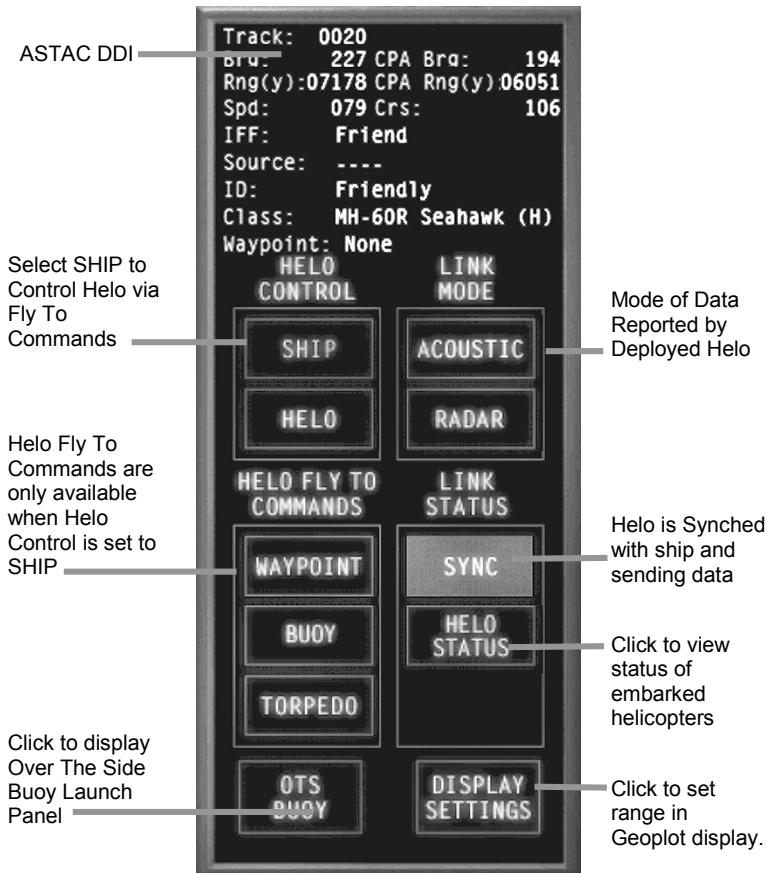
**ID:** Alliance as assigned by the player. Pending indicates Unknown or not yet specified.

**Category/Class:** Category indicates the type of platform (Surface, Air, Sub). Actual class name appears for Ownship and Ownship's helicopter or for all platforms when Show Truth is ON.

**CPA Brg:** Projected true bearing of the selected contact when it reaches its closest point of approach (CPA) to Ownship (given current course and speed of Ownship and selected contact.)

**CPA: Rng (yd):** Projected range of the selected contact when it reaches its closest point of approach (CPA) to Ownship (given current course and speed of Ownship and speed selected contact.)

**Crs:** Course of selected contact.



## Help Control

Helo Control options are only available when a helicopter is airborne *and* the helicopter symbol is selected on the ASTAC Geoplot. By default the helicopter's AI pilot is in control when the helo is launched. Control of the helicopter must be transferred to the ship before the ASTAC can set waypoints or order sonobuoy or weapon drops.

- ⇒ To **SYNC** the Heli and Ownership, click the helicopter symbol for Ownership's deployed helo on the Geoplot.

**SHIP:** Click to transfer control of the airborne helicopter to the ship (ASTAC). When SHIP has control, Heli Fly To Commands are enabled and flight, weapon and sonobuoy waypoints can be placed for the helo to follow. The button flashes for a few seconds then lights steadily when control is transferred to SHIP.

**HELO:** Click to transfer control of the airborne helicopter from the ship to the helicopter AI. The button flashes for a few seconds then lights steadily indicating that HELO control has been passed to the Heli AI.

- ✓ **Note:** In a Multiplayer game when another player or a team of players controls the deployed helo, click the SHIP button to request Helo control. The SHIP button flashes until the Helo player switches the Nav control switch to the SHIP position. That may not happen immediately or at all if the helo player does not wish to relinquish control. The Helo player must be on the ATO station to see the blinking button. If he is not there, it may be some time before he is aware of your desire to take control. You may want to send a chat message to alert him to your request. To revoke the request click SHIP again. The Helo can regain control immediately as he desires. He does not need to ask permission.

## Link Mode

When the helicopter is synched with Ownship, data can be passed from the helicopter's radar or deployed sonobuoys. Link Mode options are not available unless the ship and helo are synched and your OS Helo symbol is selected in the Geoplot.

**ACOUSTIC:** Click to receive sonobuoy data from the deployed helicopter. (Sonobuoys must be in the water and within reporting range of the helicopter for data to be passed.) Returning acoustic data from helo-dropped sonobuoys are displayed in the Sonobuoy Data Display Windows (Grams) in the FFG's Acoustic Station. [F2]

**RADAR:** In a single player game, your deployed helo is in EMCON (Emissions Control) until you order the Helo to radiate. Click RADAR to order your deployed helo to begin radiating and begin receiving the Helo's radar data.

- ❑ To process the Helo's radar data, go to the Weapons Coordinator Station [F8] and click REMRO. Helo radar detections are automatically marked as local (FFG) contacts as long as REMRO is ON.

- ✓ **Note:** In a Multiplayer game when another player or a team of players controls the deployed Helo, the player controlling the Helo must turn his Radar ON before you can receive his data when you switch to RADAR mode. The Helo's acoustic data passes automatically to you when you select ACOUSTIC whether the Helo is processing buoy data or not.

## Helo Fly To Commands

When SHIP is selected in HELO CONTROL and the helicopter symbol is selected in the Geoplot, WAYPOINT, BUOY and TORPEDO buttons are activated.

**WAYPOINT:** Flight Waypoints are marked with an F. This option is used to assign a specific flight path for the helicopter. Click WAYPOINT. A waypoint marked with an F appears on the Geoplot extending from a short line extending due north from the helicopter symbol.

**BOUY:** Sonobuoy drop points are marked with a **B**. A sonobuoy is dropped when the helicopter reaches that location.

- ⇒ Click BUOY. The Buoy Stores and selection panel appears.
- ⇒ Click the desired type of buoy then click SELECT. A buoy drop point appears after the last fly-to point or is inserted after a selected waypoint/drop point. (The number of buoys of a type that are assigned to waypoints appears in parenthesis after the count number. The count updates once the buoy is dropped.)

**TORPEDO:** Torpedo drop points are marked with a **T**. Click TORPEDO. A Torpedo drop point appears on the Geoplot. The number of torpedoes assigned to a waypoint appears in parenthesis after the number of torpedoes on-board. In the Heli Status Loadout Window. Torpedoes dropped by OS helo are set to circle search.

- ✓ **Note:** Be aware that the helicopter carries at most three torpedoes. You can place as many weapon waypoints as the helo has torpedoes.

The first fly-to point appears on the Geoplot at the end of a short line attached to the helicopter. Each new fly-to point appends to the last one.

- ⇒ To insert a waypoint or drop point in the middle of the existing flight path, click the waypoint/drop point immediately prior to the desired location then insert a new waypoint or drop point as described above.
- ⇒ Click and drag a waypoint/drop point to move it to the desired location. You may need to zoom in to be able to select the waypoint in order to drag it.

- ✓ **Note:** The embarked helicopters can be loaded out with missiles. See *FFG Stations/ASTAC Station/Helo Status/Loadout*. Only the helo's torpedoes and buoys can be launched from ASTAC. The only way to order the helicopter to fire missiles at a target is to use the Contact Menu on the Nav Map and select *Engage With> Helo 1 (or Helo 2): Hellfire (or Penguin)* if they are loaded out with that missile. The helo will engage the selected contact with the designated missile when the target is within range. Penguin missiles can only target surface ships, not land targets. Your deployed helo will not attack contacts he has identified as friendly or neutral even if you tell him to.

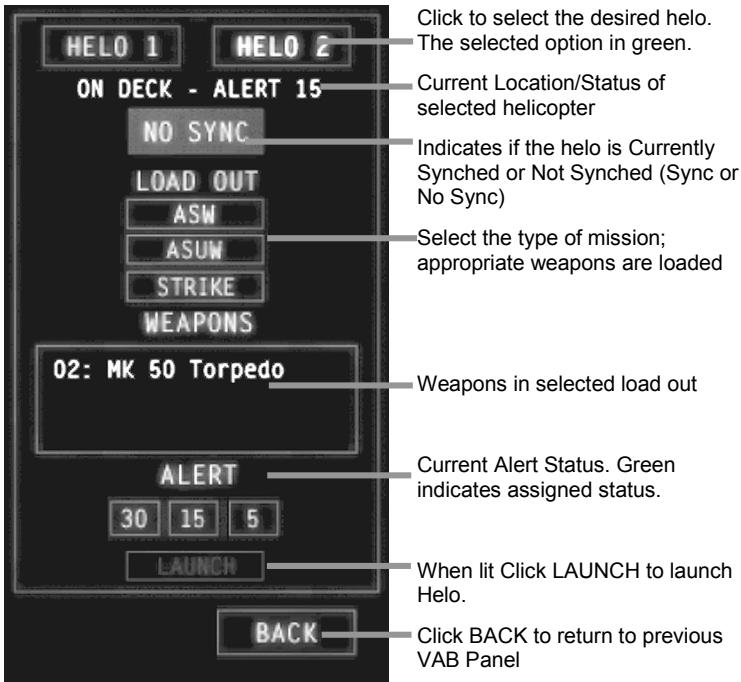
## LINK STATUS

**NO SYNC / SYNC:** When an OS Heli is in-flight, click the helicopter symbol on the Geoplot to initiate SYNC. When synchronized, data from the helicopter is transferred to the ship. This light is only lit when the helo symbol is selected in the Geoplot.

When Heli Control is set to SHIP, the Heli symbol must be selected on the ASTAC Geoplot for the Link Mode and Heli Fly To Points to be enabled. If any other contact is selected, those options are unavailable until the Heli symbol is again selected on the Geoplot.

⇒ Once Sync is established and a symbol other than the helo is selected in the Geoplot, click the SYNC light to quickly re-select the helo in the Geoplot and activate all helo control options.

**HELO STATUS:** Click HELO STATUS to display a separate panel of information on the status of both embarked helicopters. This panel also provides a means of selecting a weapons loadout for each embarked helicopter and for launching and retrieving helicopters.



Labels and areas of the Heli Status Panel are described below:

**HELO 1/HELO 2:** Click to view the Heli Status Panel for the selected helicopter.

**Location of Helicopter:** Below the helo buttons is seen the current location of the selected helicopter. (Hangar, On Deck, In Flight, Over Horizon, Down etc.)

**SYNC / NO SYNC:** A helo can only be assigned waypoints, transfer data, or be recovered if SYNC is established. Sync is two-way communication between the helo and the ship.

**LOADOUT:** Click the desired mission type to select weapons appropriate for the mission: ASW (Anti-submarine Mission) ASUW (Anti-surface Mission) STRIKE (Land attack mission.) When the Helo is in-flight, the number of weapons assigned to waypoints follows the number of weapons remaining. See *FFG Navigation Station/Contact*

*Menu/Engage With Helo 1 (or Helo2) for information on the loadouts and how to fire your Helo's missiles.*

- ✓ **Note:** 3D weapon models appear only on Ownship's 3D model. Weapons do not appear on the embarked helicopter model when it is aloft or on deck.

**ALERT:** These numbers indicate the launch status for the selected Helo. The launch status indicates the number of minutes it will take to get the helicopter airborne. When the helicopter is in the hangar with no alert status set, all digits are orange and the helo is an hour away from launch.

⇒ Click an orange Alert Status number to set the helicopter to that status. The numbers blink until that status is achieved. The number is green when the helo is in that numbered alert status.

**Alert 30:** Helo is in the hanger, pilot standing by. It will take thirty minutes to launch the helo once it achieves Alert 30 status. Both helicopters can be in Alert 30 status at once.

**Alert 15:** Helo is on deck, manned but the blades are not spinning. A helicopter in Alert 15 can be airborne in 15 minutes once Launch is clicked. Be aware that an in-flight helicopter cannot be retrieved if the on-board helicopter is in Alert 15 or Alert 5 status. Only one helo at a time can be in Alert 15.

**Alert 5:** Helo is on deck and blades are spinning. The helicopter can be airborne in 5 minutes when LAUNCH is clicked if it is in Alert 5 Status. Beware that leaving the Helo in Alert 5 expends fuel.

- ✓ **Note:** The LAUNCH button is enabled only when GREEN DECK is set.

**Tip:** Turn on Aircraft Quick Launch in the *Options>Game* screen to reduce the Alert status times from minutes to seconds.

**LAUNCH / RETRIEVE:** Click the available button to Launch the selected embarked helo or retrieve the selected in-flight helo. An orange button can be selected.

- ❑ If you have ordered your in-flight helo recovered, only Alert 30 can be set for the helo in the hangar.
- ❑ If the Helo in the hangar has been ordered to launch the Recover button for the in-flight aircraft is disabled until after the other helo is airborne.

## ***Launching a Helicopter***

From the Bridge Station's Flight Conditions panel:

1. Click Green Deck.

From the ASTAC Station's Helo Status panel:

2. Click LAUNCH. (The LAUNCH button is not enabled unless Green Deck is set.) If the helicopter is in the hangar and no alert status has been set, it takes sixty minutes from the moment you click LAUNCH to get the helo airborne. (If Aircraft Quick Launch is selected in the *Options>Game* menu, the time it takes to launch is set in seconds instead of minutes.)
3. When the helo completes the countdown, the helo will launch automatically if GREEN DECK is set.
4. The Flight Deck must be set to Green Deck before a helicopter can be launched *or* recovered. Set Green Deck from the Bridge Flight Conditions panel or from the Orders Menu or with a voice command.
  - Alternately, you can leave the flight deck in Red Deck status and click 5. This will take the Helo to Alert 5 status (on deck, blades spinning, ready to launch within 5 minutes. Then when you want to launch, set Green Deck and click LAUNCH.

---

**Tips:** Check the Wind Envelope and the ships pitch and roll from the Bridge Station to ensure that safe flight conditions exist. Launching when Flight Conditions are unfavorable could result in a crash of the helicopter.

Plan ahead! If you do not have Aircraft Quick Launch enabled, it takes an hour to get one helo airborne when no alert status is set. Set both the helicopters to Alert 30 at mission start. (You may want to set one helo to Alert 30 and one to Alert 15.)

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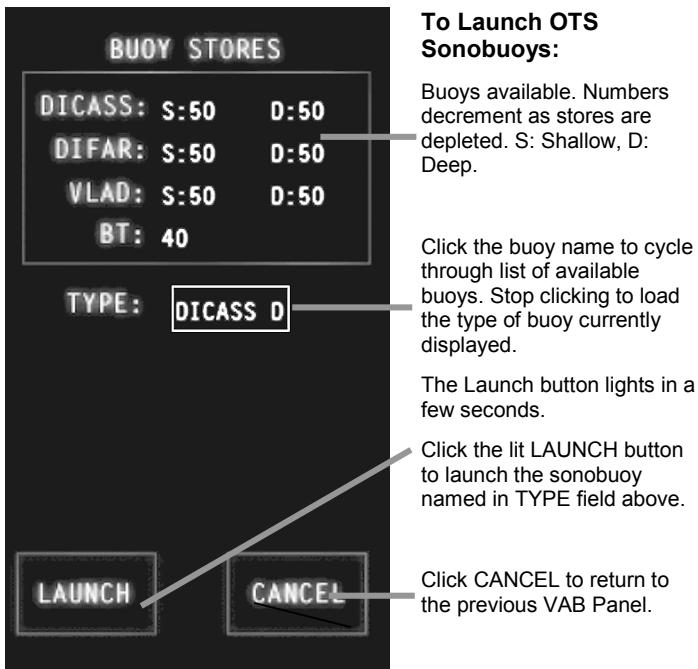
## **Recovering a Helicopter**

Once a helo is airborne the LAUNCH button becomes the RECOVER button.

- ⇒ Click RECOVER to order an In-flight helo to land on Ownship.
- If you have ordered your other helo to Alert 15, Alert 5 or Launch status, the RECOVER button is disabled until the other helicopter is launched.
- Once RECOVER is selected, the helo disregards all subsequent orders until you cancel the RECOVER order. Click the flashing RECOVER button to cancel the order.
- In a Multiplayer game you cannot use the RECOVER button to retrieve your airborne helicopter if another player is manning the helo. It is up to the player to return to the ship if he so desires. AI. driven helicopters function identically in single and multiplayer games.

## **OTS BUOY**

The FFG-7 carries four types of Over The Side (OTS) sonobuoys. Click OTS BUOY to access Over The Side Sonobuoy Launch Panel.



### **FFG OTS Sonobuoy Launch Panel**

- Sonobuoy data displays in the Acoustic Station.

### **Activating and Scuttling Buoys**

Any Ownside launched DICASS buoy can be activated from the ASTAC Station. Any type of buoy belonging to Ownside can be scuttled from the ASTAC station as long as the buoy symbol is present on the Geoplot.

1. Click a buoy symbol on the ASTAC Geoplot. The Buoy Activation/Scuttle Panel Appears in the VAB Panel.
2. Click ACTIVATE to set a selected DICASS Buoy to Active Mode and start it pinging. There is always a time delay after a buoy is dropped before an OTS or Heli dropped buoy can be set to activate. It must be in the water long enough to have deployed the cable. Only DICASS buoys have an active mode. The ACTIVATE button is greyed unless a DICASS Buoy is selected.
3. Click SCUTTLE to delete the selected buoy. The symbol is removed from the Geoplot and the Nav Map and no longer sends signals to the acoustic station.
4. To exit the Buoy Activation Panel, click on a different symbol on the Geoplot.

## Display Settings

Click DISPLAY SETTINGS to access a panel of Geoplot display range settings.

Numbered buttons: Click the number of the desired display range.

**CENTER OS** button: Click to center the Ownship symbol in the center of the Geoplot.

**CENTER HOOK** button: Click to center the symbol currently selected in the Geoplot.

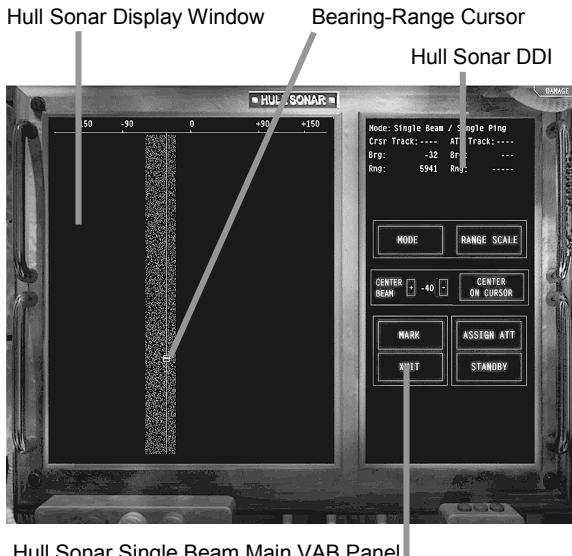
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## FFG HULL SONAR STATION [F4]

The FFG-7 is equipped with the SQS-56 active-passive hull sonar. The Hull Sonar Station is used mainly to control active sonar emissions and view returns in the Sonar Display Window. The active sonar operates in 4 different modes: Single Beam, Omni-directional, Omni-directional Rotational, and High Frequency.

The symbol for a contact marked in with active sonar appears on the Nav Map at the end of a green LOB at the range reported by the sensor. Only one tracker (Automated Target Tracker) is available in Active Sonar.

Passive sonar mode is also available. Passive sonar mode supports detection of broadband contacts and has no narrowband or tracking capability.



## HULL SONAR DISPLAY WINDOW

The mode and transmission type selected in the Mode Selection VAB Panel determines what appears in the Hull Sonar Display window. The format varies as described below:

### **Active Mode: Single Beam/Omni Modes**

When single beam, omni or omni rotational mode is selected, the Y (vertical) axis of the Active Sonar Display is range, from 0 at the bottom to the selected range at the top and the X (horizontal) axis is relative bearing from -180 to 180, with 0 at the center.

Unlike the submarine interfaces, the FFG-7 active sonar display is not interlaced; each ping fills the entire display, fading older returns as it draws in the window.

- ⇒ Click RANGE SCALE in the VAB Panel to set or view the display range.

The Sonar Display in Active Mode contains a box cursor attached to a bearing indicator line.

1. Click MODE then click ACTIVE.
2. Click SINGLE BEAM, OMNI, or OMNI ROTATIONAL as desired.
3. Click BACK.
4. Click XMIT to transmit in the selected mode. (The current selected mode appears in the top line of the DDI.)
5. Click a contact on the display or click and drag the square cursor in the Sonar Display Window to center the box on a contact.
6. Click MARK to send a single bearing and range report to the Nav Map and the TMA Station.
7. If desired click ASSIGN ATT to assign a tracker to the contact. The tracker assignment appears in the DDI on the next transmission. (Click UNASSIGN to remove the tracker from the contact.)

The bearing and range at the location of the cursor displays in the DDI area in the right-hand CRT, as well as any marked track under the cursor.

### **Active Mode: High Frequency**

When High Frequency is selected, the Sonar Display Window depicts the outline of underwater contacts directly in front of the ship.

1. Click MODE then ACTIVE.
2. Click HIGH FREQUENCY then BACK.
3. Click on any contact on the map. There is no background noise.
4. Click MARK. All contacts detected by the High Frequency Sonar are marked on the Nav Map when the MARK button is clicked once.

- ☐ High-frequency contacts are not given contact numbers and do not appear in TMA. They appear as a Map Marker with the label HF Sonar Mark at the exact location of the detection.

## Passive Mode Display

When passive mode is selected, detected broadband data appear as bright lines in a waterfall display in the Sonar Display Window. The cursor appears as a line above the waterfall. Contacts can be marked only; no trackers can be assigned in passive mode.

1. Click MODE then PASSIVE.
2. Click BACK. The only available VAB buttons are MARK and MODE.
3. Click on a contact line in the display window to move the cursor to that bearing. (Bearing shown is relative bearing.)
4. Click MARK to send the bearing data to the Nav Map and TMA Station.
5. Click MODE to return to the Mode Selection VAB Panel.
6. Click ACTIVE to return to the Active Mode Selection Panel.

✓ Note: In heavy seas, you may notice gaps in noise in the Passive Display. These occur when the bow sonar breaks the surface of the water.

## HULL SONAR DDI

The Hull Sonar DDI area of the VAB Panel provides the following information.

**Mode:** Current sonar mode and transmission interval (when applicable).

**Crsr Track:** Displays the track number of any marked contact at the bearing-range cursor location.

**Brg:** Relative bearing at the location of the cursor.

**Rng:** Range (in yards) at the location of the cursor.

**ATT Track:** Shows the Automated Target Tracker number when the ATT is assigned to a contact. See *Assign ATT* below. (Track number appears here on the next sensor return.)

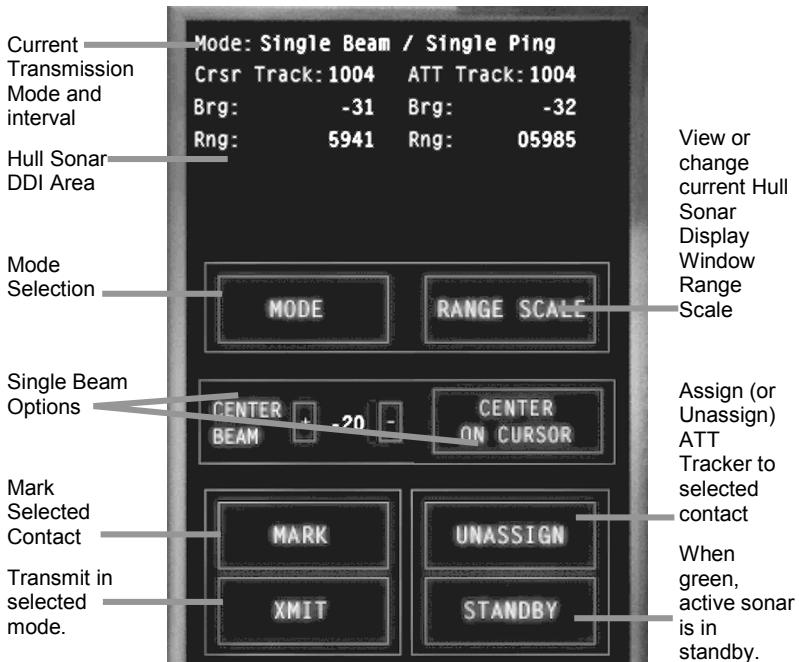
**Brg:** Relative bearing to the contact to which the ATT is assigned.

**Rng:** Range (in yards) to the contact to which the ATT is assigned.

- ☐ When High Frequency is selected, only cursor bearing is reported in the DDI. When the contact is marked, the range to the contact is displayed in the (cursor) Rng field.
- ☐ When Passive Mode is selected only cursor bearing is available in the DDI when a contact line is clicked.

## HULL SONAR MAIN VAB PANEL (ACTIVE MODE)

By default Active Mode Single Beam/Single Ping is selected in main VAB panel. Beam centering options are only available when Single Beam mode is selected. All other button options seen here are also available for Omni and Omni Rotational modes.



### *Hull Sonar Default (Main) VAB Panel: Active Mode*

Shown above is the Active Mode Main VAB Panel with SINGLE BEAM selected by default. This default Active VAB panel is described below:

**MODE:** Click to display the Sonar Mode Selection VAB Panel. Here alternate sonar modes are selected (three active modes or the passive mode). If an active mode is selected, select a transmission mode: single or continuous pings.

**RANGE SCALE:** Click to display the Range Scale Selection Panel. In the Range Scale Selection Panel click a button to choose the range scale desired for the Active Sonar Display Window (2, 5, 10, 15 or 20 KYDs). Click BACK to return to Active Mode Main VAB Panel. When BACK is clicked, any active transmission is stopped. You must click XMIT to initiate transmission.

**CENTER BEAM:** (Single Beam Mode only) Centers the transmitted beam on the bearing selected in the digital readout.

⇒ Click the + or – to select the desired bearing then click XMIT.

**CENTER ON CURSOR:** (Single Beam mode only): Focuses transmitted beam in the bearing where the cursor is located.

⇒ Click in the Active Sonar Display to move the cursor to the desired bearing location.

⇒ Click CENTER ON CURSOR then click XMIT.

**MARK:** Click to send a single bearing and range report to the Nav Map and TMA Station for the contact under the cursor.

**XMIT:** Initiate transmission in the selected transmission mode and interval.

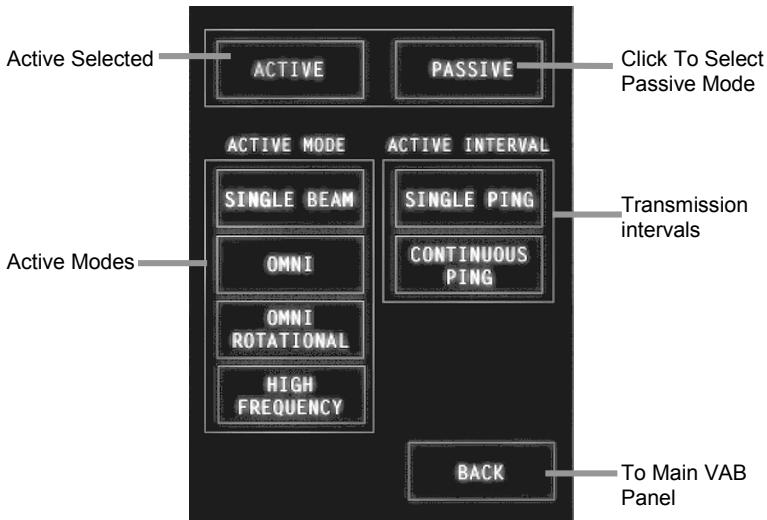
**ASSIGN ATT** Click to assign the Automated Target Tracker (ATT) to the selected contact. When assigned, the ATT follows the target and automatically marks a new bearing and range with each return. The track, bearing, and range are updated in the DDI. (One Automated Target Tracker is available.) If the track to which the ATT is assigned is not selected, the ASSIGN button is available. Select a different contact and click ASSIGN ATT to automatically reassign the ATT to the new track.

**UNASSIGN:** This text is visible only when the ATT is assigned and the track to which the ATT is assigned is selected. Click to un-assign the Automated Target Tracker.

**STANDBY:** Click to stop continuous active sonar transmission. Green text indicates the active sonar is in standby mode.

## **SONAR MODE SELECTION VAB PANEL**

Selecting MODE In the Main VAB panel displays the SONAR Mode Selection VAB Panel used to select the desired sonar mode - Active or Passive - and the transmission intervals for Active Mode. Different VABs are activated depending on whether Active or Passive mode is selected.



**Sonar Mode Selection VAB Panel**

## Sonar Mode Selection VABs: Active Options

The following buttons are available in the Sonar Mode Selection Panel when Active Mode is selected.

**ACTIVE:** Selected mode (Green)

**PASSIVE:** Click to switch to Passive Mode Selection VAB Panel

### Active Mode Options

**SINGLE BEAM:** Focuses transmission of all acoustic energy on a single beam. (Click BACK to select the beam bearing on which to focus.)

**OMNI:** Transmits acoustic energy in all directions.

**OMNI ROTATIONAL:** Transmits acoustic energy one beam at a time in quick rotation until all directions are covered.

**HIGH FREQUENCY:** Transmits high frequency acoustic energy directly ahead of the ship. This mode is used to avoid mines and icebergs.

### Active Transmission Interval Options

**SINGLE PING:** Transmits a single emission of acoustic energy (one ping) when XMIT is clicked.

**CONTINUOUS PING:** Transmits continuous emissions of acoustic energy when XMIT is clicked.

**BACK:** Returns to Main VAB panel where detected contacts can be marked.

✓ **NOTE:** The selected transmission mode and interval type appear together in the top line of the DDI area.

## Sonar Mode Selection VABs: Passive Options

Only three buttons are active when Passive is selected:

**ACTIVE:** Click to access Active Mode Selection VAB Panel.

**PASSIVE:** Selected Option (Green)

**BACK:** Click to access the Passive Mode Main VAB Panel.

## Passive Mode Main VAB Panel

The only functionality in passive mode is the ability to mark contacts. When Passive is selected in the Sonar Mode Selection Panel, click BACK to access the Passive Mode Main VAB Panel. These two buttons are enabled.

**MODE:** Click MODE to access the Mode Selection VAB Panel.

**MARK:** Click MARK to send a bearing report on the selected contact to the Nav Map and TMA and assign a track number to the contact.

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## FFG Navigation Station [F5]

The Navigation Station (Nav) with its Nav Map and 3D View is the default station when entering a mission. The Navigation Station functionality is the same regardless of controllable platform and the basic information on the Nav is covered only once in this manual. See *Navigation Station*. Menu functionality unique to the FFG is contained here.

## FFG Ownership/Orders Menus

To access the Ownership Menu, click the Ownership NTDS symbol on the Nav Map to select it, then right-click on the selected symbol. The majority of the FFG's Ownership Menu items are identical to those in the Task Bar Orders Menu. See *FFG Stations/FFG Task Bar/Orders Menu* for a description of those menu items. The rest of the Ownership Options require the use of the Nav Map. With the exception of the option below, Ownership Menu options are the same from platform to platform and are described in *Navigation Station/2D Navigation Map/Ownership Menu*.

**Fire Tube [X]:** This option appears in the Ownership Menu only when a target is assigned to a tube and the tube is readied to fire in the Torpedo Control Station. When all that is left to do is fire the tube, this option is available. Select the option to fire the weapon in the tube at the pre-selected contact.

✓ **Note:** In the Torpedo Control Station, you are not prevented from assigning a torpedo to a target that is out of range of the torpedo. This option fires the weapon as assigned and preset in the Torpedo Control Station.

## FFG CONTACT MENU

The Contact Menu appears whenever you right-click on a contact's NTDS symbol on the Nav Map. Most menu items are the same from platform to platform however there are several options that are unique to the FFG. The following Contact Menu options are available when you are commanding the FFG in S.C.S. - *Dangerous Waters*.

**Engage With:** These menu options are available when you select and right-click on a valid contact symbol. The contact must be categorized as a surface, sub, air or land contact (it can not have the unknown category symbol) before any Engage With options are available. This option is not available if the contact is a member of Ownside. Depending on what is currently available in the FFG's weapons loadout and what is within range of the weapon, the following may appear:

**MK 13: Harpoon:** The Harpoon targets surface ships and has a standoff range of 5 nautical miles. If the selected contact is closer than 5 nautical miles, the Harpoon option is greyed out. The Harpoon's maximum range is modeled as 70 nautical miles.

**MK 13: SM-2:** While primarily a surface to air missile, the SM-2 can also be fired at surface contacts. A maximum range of 81 nautical miles is modeled for this weapon.

**76mm Gun:** The gun can target surface and land contacts within 10 nautical miles of Ownship.

**Tube [X]: MK 50 Torpedo:** This weapon can target submarines and surface ships within 7 nautical miles of Ownship.

**Tube [X]: MK 46 Torpedo:** This weapon can target submarines and surface ships within 6 nautical miles of Ownship.

- ✓ **Note:** Torpedo options are greyed if the selected contact exceeds the range of the torpedo. A specific tube is unavailable if it is empty or that bank of tubes is currently reloading in the Torpedo Control Station.

**Helo1 and/or Helo 2:** When the FFG's embarked helicopters are in-flight they can be ordered to attack contacts using the *Engage With* menu. Be aware that your deployed helo will not attack contacts he has identified as friendly or neutral even if you order him to do so using this *Engage With* command. **These options are not available in a multiplayer game when a player mans your deployed helo.**

**Hellfire Strike:** This missile can target land contacts within range of the in-flight helicopter. (It cannot target surface ships.) When this option is selected the in-flight helo flies to and engages the selected target. The helicopter carries a pod containing 4 Hellfire missiles when a STRIKE is assigned as the loadout in HELO STATUS.

**Penguin:** This missile can target surface ships within range of the in-flight helicopter. When this option is selected the in-flight helo

flies to and engages the selected target. The helicopter carries one Penguin missile in addition to two MK 50 Torpedoes when ASUW is assigned as the loadout in HELO STATUS.

**MK 50 Torpedo or MK 48 ASW Torpedoes:** The MK 50 can target subs and surface ships within range of the in-flight helicopter. The torpedo is set to circle search. The FFG's AI driven helo also carries one MK 48 AWS torpedo that can only target submarines. When this option is selected the in-flight helo flies to and engages the selected target. The helicopter carries two MK 50 torpedoes and one MK 48 ASW torpedo when ASW is assigned as the loadout in HELO STATUS.

- ✓ **Note:** the only way to launch the FFG's embarked helicopter's missiles is with this command. Only the MK 48s carried by the AI driven helo are restricted to submarine targets. All other MK 48 Torpedoes can target surface ships as well as submarines. Hellfire missiles launched by player controlled MH-60s can target surface ships as well as land targets. Only the Hellfire's on the AI driven helo are restricted to Strike only.

**OS Helicopter Contact Menu Options:** When you click on the NTDS symbol of your deployed MH-60R helicopter the following options are available,

**Data Link:** These options are shortcuts to the ASTAC Heli Control Options. See FFG ASTAC Station for full information on these options.

**Link Control:** Select Ship or Helo control. The selected option determines who has flight path control over the deployed helo. When SHIP has control, you can place flight, weapon and sonobuoy waypoints for the helo to follow in from the ASTACT station.

**Link Data:** Select Radar or Acoustic. This sets the type of data to receive from the deployed helicopter.

**Recover:** Click to order the selected helo back to the ship. The Heli disregards any subsequent orders until you cancel the Recover order.

⇒ To rescind the Recover order, select the ASTAC Station then click HELO STATUS. Click the flashing RECOVER button to cancel the Recover order.

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## FFG TOWED ARRAY STATION [F6]

The Towed Array Station is used to detect, mark, track and classify contacts of interest. At this station DEMON processing is also available, which is used to determine the speed of a contact. The Frequency Profile Library in the Single Beam display mode provides for classification of contacts that match known sound signatures.

The FFG utilizes the AN/SQR-19 Tactical Towed Array Sonar System (TACTASS). The towed array is dragged a mile behind the ship. Because of

the great distance, the ship itself does not mask any part of the environment, thus the FFG's towed array provides 360° detection.

- ✓ **Note:** Be aware that Ownship always appears as a contact on the FFG's towed array. In S.C.S. - *Dangerous Waters* TACTASS provides 360° detection even if the array is not fully deployed. The array is always modeled as level even when it appears to droop in the 3D View.

The towed array (TA) automatically “tags” frequencies and assigns a number to them. These numbered tags represent every frequency that the TA is currently detecting and information about each tag appears in the Tag Summary window in the upper left of the screen when in Broadband mode. The rest of the FFG's systems (the Nav and the TMA Station) know nothing about a tag or the contact it represents until it is marked by you or the Autocrew or assigned an Automatic Tag Follower (ATF) to track its movements. Once marked, the contact is assigned a track number.

- ✓ **Note:** Remember: the four-digit *track number* generated when a contact is marked in the towed array and used by the Nav Map, TMA and other stations is not the same as the two-digit *tag number* associated with the marked frequency in the Towed Array Station.

The Towed Array Station provides access to three display modes for the purpose of marking, tracking, and classifying tags of interest: Broadband, LOFAR and Single Beam.

## TOWED ARRAY STATION NAVIGATION BUTTONS

Common to all display modes at the FFG's Towed Array Station are the Navigation buttons below the Towed Array Variable Action Button (VAB) Panel.

**BROADBAND:** Click to select BROADBAND display mode.

**LOFAR SEARCH:** Click to select LOFAR SEARCH display mode.

**SINGLE BEAM:** Click to select SINGLE BEAM display mode.

## FFG TOWED ARRAY: BROADBAND

The FFG's Broadband display mode consists of six areas: the Tag Summary in the upper left corner, the circular “Whiz-wheel”, the Waterfall Display, the DDI Area, the VAB Panel and the Towed Array Navigation Panel. In broadband mode frequencies are detected, marked, Automatic Tag Followers (ATF) (trackers) are assigned, and ambiguous bearings are resolved.

Until the towed array is deployed, no contacts appear in the waterfall. Towed array contacts do not appear immediately when you deploy the array. If the towed array is not already deployed at the beginning of the mission, you can stream it from the Bridge in the Tow and Countermeasure Panel or via the Orders or Ownship Menu's *Sensors>Towed Array* option.

Because of the physics of the towed array construction, the actual contact and an **ambiguous** contact, a mirror image of each actual contact, is reported to the system. The actual and ambiguous contact bearings shown in the Tag Summary are in relative bearing. Relative bearing assumes ship's heading is at 000. Because of the array's conical beams, the two bearings, one to starboard and one to port, will be equally spaced from the ship/TA heading (mirrored). The bearings are always measured clockwise. So, the starboard bearing will fall between 000 and 180, and the port bearing will always be between 180 and 360.

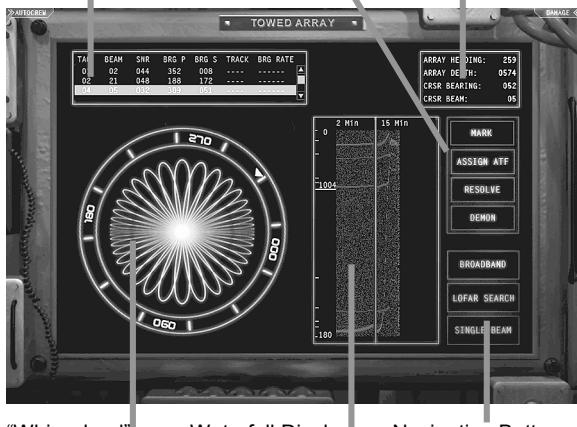
Resolving which contact is the actual contact and which is the mirrored contact is part of your task in the Broadband mode. Unresolved bearings are reported as port and starboard bearings simultaneously (for example 270 (port), and 090 (starboard)) in the tag summary. To determine which bearing is the actual contact, maneuver the ship. If Ownship turns to the right, the signal from a contact on the starboard (right) side of the towed array moves up the waterfall display (for Ownship turns to the left the signal moves in the opposite direction.) When you determine which is the actual bearing to the contact, resolve the bearing to remove the ambiguous reading. (See **RESOLVE** in the VAB panel description below.)

A symbol for both the actual and ambiguous contacts appears on the Nav Map until the contact is resolved. Once resolved, only the contact located in the position as resolved (Port or Starboard) appears on the Nav Map. On the TMA plot the lines of bearing remain on the plot as drawn for both contacts, (If both have been previously viewed in TMA) but the Contact ID for the ambiguous contact is removed from the track selection dropdown list. If you decide you resolved incorrectly and select the contact in the Tag Summary and resolve it as the opposite location, the previously removed contact is returned to the Nav Map and the now ambiguous contact is removed. The previously deleted Track ID is returned to the TMA Track selection list (at the bottom) and the ambiguous Track ID is removed.

Tag Summary

VAB Panel

DDI Area



"Whiz-wheel"

Waterfall Display

Navigation Buttons

## FFG-7 Broadband Tag Summary

The towed array system automatically tags all frequencies giving each a sequential 'tag' number (01 – 99). Each tag number appears in the scrolling Tag Summary list along with information relative to each tagged frequency. Any given contact may have 4 or 5 tags depending on how many frequencies are detected. Selecting a Tag Summary moves the waterfall cursor to highlight the appropriate trace and DDI information changes to reflect the selected summary. The following information is available in the Tag Summary.

**TAG:** A two-digit number is automatically assigned to a frequency detected by the towed array. The towed array keeps track of up to 99 frequencies. This tag number is used only in the Towed Array Station. A four-digit track number is assigned to the contact whenever it is marked in the Towed Array Station. An asterisk appears before this number when an Automatic Tag Follower (ATF) (tracker) is assigned to a tag. All tags assigned an ATF are promoted to the top of the tag summary.

**BEAM:** This number indicates which of the towed array's 22 conical beams is currently detecting the selected contact.

**SNR:** Signal To Noise Ratio of this contact. Larger numbers indicate a stronger signal.

**BRG P:** Actual (or ambiguous) port bearing of the contact. If actual bearing is resolved to be the starboard contact, this field is empty.

**BRG S:** Actual (or ambiguous) Starboard bearing of the contact. If actual bearing is resolved to be the port contact, this field is empty.

**TRACK:** Lists the Track number assigned to this Tag once the contact has been marked or assigned an ATF.

- ✓ **Note:** Notice that two track numbers flash in this field when a track is marked. Because of the way the towed array processes signals, two track numbers are assigned when a Towed Array contact is marked. One number represents the bearing of the actual contact and the other an ambiguous (mirrored) bearing. The track numbers are consecutive and will continue to flash until you resolve the bearing ambiguity via the RESOLVE function. See *Towed Array Broadband VAB Panel/Resolve* later in this section.

**BRG RATE:** Bearing rate of the contact. The bearing rate is only present once the actual bearing is resolved via the RESOLVE button in the VAB Panel.

## Whiz-Wheel

The circular "whiz-wheel" helps the operator visualize the towed array heading and the beams on which signals are being received. The inner loops represent the 22 beams of the towed array. A signal at relatively short range is likely to overlap more than one beam.

The outer bearing circle rotates to show the true heading of the towed array. The heading at the 12 o'clock position is the array's heading. This will be close to Ownship's heading once Ownship is on a steady course but since the array is towed a mile behind the ship, the array's heading is affected by currents and will rarely be exactly the same as Ownship's heading.

When a contact is selected in either the Tag Summary or the waterfall display the triangular cursor moves to indicate the beam detecting the contact.

### **FFG Broadband Waterfall Displays**

The FFG's broadband waterfall display consists of two areas with data scrolling sideways from left to right. Contacts appear as darker orange lines on a background of orange "noise". Stronger contacts are thicker and darker than faint contacts. A tic mark (tag) appears next to any contact in the waterfall with a signal to noise ratio over one.

The waterfall displays share a bearing cursor that can be moved to the desired location by clicking and dragging it or by simply clicking on a location in the left half of the display. The cursor is linked with the "whiz-wheel" so moving the cursor in one display moves it to the approximate location in the other. Clicking on a Tag number in the Tag Summary selects that frequency tag and moves the cursor to that bearing in the waterfall display. The location of the cursor in the outer numbered portion of the Whiz Wheel approximates the starboard side of the conical beam detecting the selected frequency.

### **Marking Contacts in Towed Array: Broadband**

Towed array tag data is local to the Towed Array Station until the tag is marked or an ATF is assigned. Marking a tag sends two bearing reports to the Nav Map and the TMA station: the bearing of the actual contact and the bearing to an ambiguous contact, the mirror image of the actual contact. Your task is to determine which bearing is the real one and resolve the ambiguity. (See RESOLVE VAB below.)

- ⇒ To mark a contact (tag), select the tag number in the Tag Summary or click on a trace line in the waterfall then click MARK in the VAB Panel. (Clicking ATF also marks the contact but also assigns an Automatic Tag Follower.)
- Two consecutive track numbers are assigned and appear in the Tag Summary. One number indicates the actual bearing to the contact and the other the bearing to the ambiguous contact. Contacts marked by Ownship sensors are assigned four-digit track numbers. Both of the assigned four-digit track numbers appear in the Tag Summary in the TRACK column. The two consecutive numbers alternate in the track column until the contact ambiguity is resolved.

## Assigning an Automatic Tag Follower (ATF)

Automatic Tag Followers (ATF) can be assigned to up to eight frequency tags in the FFG Towed Array system. When an ATF is assigned, data on that contact is continuously sent to the Nav Map and TMA plot. In the Tag Summary an asterisk appears in front of the tag number for every frequency that is assigned an ATF. On the Nav Map the contact symbol moves based on each two-minute report from the Towed Array or the TMA solution you have entered for the contact.

- ✓ **Note:** When contacts are very close to OS the bearing may seem off if measured from Ownship on the Nav Map or the TMA Plot. Remember that the towed array is dragged a mile behind the ship and the bearing is measured from the towed array, not the ship.

1. Click the tag summary of the desired frequency tag or click on the tag marker (short line) associated with the desired contact trace in the waterfall display to select it.
2. Click ASSIGN ATF. An asterisk appears next to the tag number in the Tag Summary and the assigned track numbers flash beside the tag marker in the waterfall. The two numbers are the track numbers for the real and ambiguous bearings associated with that detection. These track numbers are seen on the Nav Map next to the unknown/unknown symbols generated at the end of magenta colored lines of bearing. The track numbers associated with the marked contact also flash in the TRACK field in the Tag Summary.
3. If all eight ATFs are already assigned, the oldest assigned ATF is dropped to free the follower for a new assignment.
4. To un-assign an ATF, click the track number in the waterfall and drag the number out of the waterfall.

## Towed Array Broadband DDI

In the Broadband mode the following data is available in the Digital Data Indicator:

**ARRAY HDG:** Current heading of towed array.

**ARRAY DPTH:** Depth in feet of the towed array.

**CRSR BRG:** Relative bearing at the location of the cursor.

**CRSR BEAM:** Number of the array beam at the location of the cursor.

## Towed Array Broadband VAB PANEL

In Broadband display mode the VAB Panel provides the following button options:

**MARK:** Click to mark the selected tag (waterfall) contact. This assigns a track number to both the real and mirrored contact and sends a bearing report to the Nav Map and the TMA plot. The two track numbers alternate (flash) next to the trace line in the waterfall and in the TRACK field in the Tag Summary for the selected contact.

**ASSIGN ATF:** Click to assign an Automatic Tag Follower to the selected tag frequency. Bearing data is updated on the Nav Map, Geoplot and TMA stations as long as the ATF is assigned. If the contact was not already MARKED, assigning an ATF also marks the contact.

**RESOLVE:** Click to display the PORT and STBD (starboard) buttons in the VAB Panel. If for example you have determined that the actual contact is to the port of Ownship, click PORT to resolve the ambiguity and designate the contact on the port side of the ship as the actual contact. The bearing data appears only in the Port column in the Tag Summary and the bearing rate is now noted for that contact in the Tag Summary's BRG RATE field. The contact at the designated bearing is now the only contact that appears on the Nav Map. In the TMA Plot the bearing lines remain for both contacts but only the track number for the resolved contact appears in the selection list. If you decide not to resolve the contact at this time, click RESOLVE to return to the Main VAB panel.

- ✓ **Note:** The Towed Array reports a contact bearing as well as its mirror image. The mirror image is called the ambiguous contact or bearing. Your task is to resolve the ambiguity and determine which bearing is the true one. Once you determine which bearing report represents the true contact, designate the contact on the appropriate side of the towed array as the true contact using the RESOLVE feature.

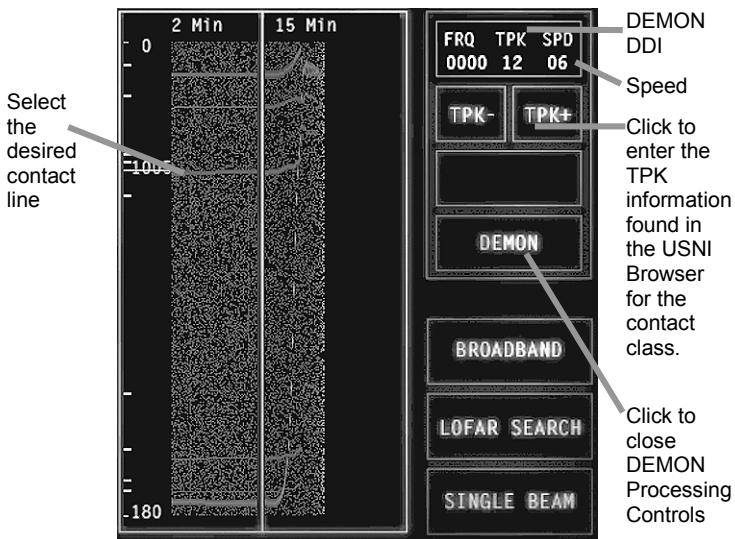
**DEMON:** Click to display the DEMON Processing controls. DEMON stands for Demodulated Noise and is used to determine the speed of surface and submerged contacts.

### **Determining a Contact's Speed using DEMON:**

To determine a surface or sub-surface contact's speed accurately, you must have classified the contact in the Towed Array Single Beam All Band search, the Acoustic Station, the EW Station or visually. The number of turns per knot (TPK) produced by a specific class of ship or sub is listed in the USNI Browser Information for that class.

1. Classify the contact and look up the USNI information for that ship class. Make a mental note of the TPK information listed in the text file.
2. Click DEMON in the Towed ARRAY Broadband Station to access the Demon Processing Controls.
3. Place the cursor on the desired contact line in the Waterfall. The system automatically determines the required frequency information and places it in the FRQ field in the DEMON DDI.
4. Click TPK + and TPK - until the TPK number noted in USNI for the class appears in the TPK field.
5. When the number is entered the number listed in the SPD field in the DEMON DDI is the approximate speed of the contact, given

that your classification is correct and you have selected the correct contact in the waterfall. Enter that speed in speed entry at the TMA Station for the appropriate contact.



### ***DEMON Processing Controls***

## **LOFAR SEARCH SUMMARY**

Frequency signals on any of the 22 beams of the FFG's towed array are seen in the LOFAR Search Summary. The display is mostly informational. Frequencies that are associated with a contact are assigned a single tag number. The only interaction is changing the time scale for the display and the selection of a beam to view in Single Beam All Band display mode.

Individual beam waterfall displays

LOFAR DDI



The following actions can be taken in LOFAR Search mode:

- ⇒ Hold the cursor over a frequency signal to show that frequency in the LOFAR SUMMARY DDI. Click in a display to note the tag numbers assigned to the detected frequencies seen there.
- ⇒ Click a beam waterfall display to select it; the beam is highlighted to indicate its selection. Click SINGLE BEAM to view the selected beam in Single Beam All Band display mode. The tag numbers of each frequency appears above the waterfall lines.
- ⇒ Double click on a beam display to switch to the Single Beam All Band display mode with that beam selected or select the beam and click SINGLE BEAM.

### LOFAR Search DDI

**ARRAY HDG:** Current heading of the towed array.

**ARRAY DPTH:** Current Depth of the towed array in feet.

**CRSR BEAM:** Beam number at the location of the cursor.

**CRSR FREQ:** Frequency at the location of the cursor.

**CRSR TRACK:** Assigned track number associated with the trace line at the location of the cursor.

### LOFAR Search VAB Panel

**LONG TIME SCALE:** Click to set waterfall data update rate to every 12 seconds for 8 minute averaging.

**SHORT TIME SCALE:** Click to set waterfall data update rate to every 6 seconds for 5 minute averaging.

- Changing time averaging changes the update rate, but does not refresh the display. The change is in effect for all beams.

## SINGLE BEAM ALL BAND DISPLAY

The Single Beam display mode is used to match received frequencies to sound frequency profiles of known classes found in the Frequency Profile Library. This is useful for classifying contacts.

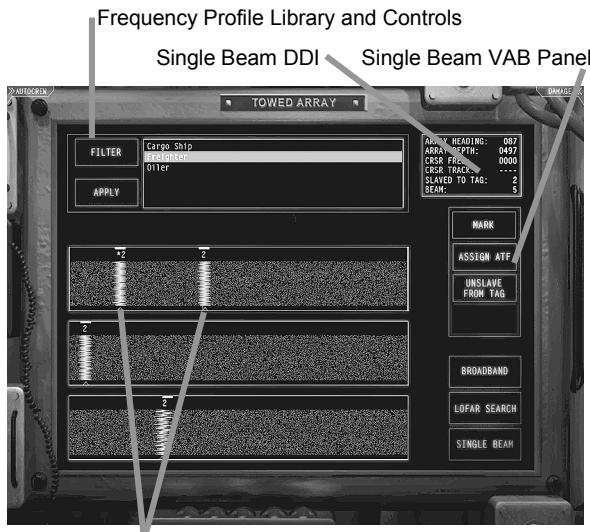
The beam data seen in Single Beam is selected in the LOFAR Search Screen either by double-clicking on the desired beam or selecting the beam then clicking SINGLE BEAM.

In the Single Beam display, frequency data from a single beam appears in three separate waterfalls. The x-axis in each waterfall is frequency, increasing from 0-399hz in the top waterfall, to 400-799hz in the middle display, and 800-1199hz in the bottom waterfall display.

The y-axis is time, with most recent data at the bottom, scrolling up as it ages. This display shows 90 seconds of data with 1-second updates. The frequency under the single vertical cursor displays in the DDI in the Cursor Freq field.

The tag number associated with frequencies deemed to be from the same contact appear above the trace lines in the waterfall next to a frequency marker and a tag marker.

The frequency marker is a small block that is an indication of the strength of the signal. A detection with a strong signal to noise ratio has a larger marker. The marker may appear even when a trace line is not visible in Single Beam. The trace may be visible in LOFAR because of the longer time averaging. Sometimes tag numbers appear over each other when two similar frequencies are detected on the same beam.



Tagged frequencies on the selected beam

### **FFG Towed Array – Single Beam**

## **Frequency Profile Library**

The Frequency Profile Library is used to determine the classification of a contact based on the frequencies it emits. The ship's computer has a library of sound profiles (frequency profiles.) When a ship, sub or torpedo is selected in the library, the sound profile for that class is represented by a caret at a specific frequency at the bottom of the Single Beam display windows.

When the frequency lines in the detected contact closely match the carets indicating a known class profile, there is a likelihood that the contact you are detecting is of the class in the profile. Many profiles are similar so there is some likelihood of error. Matching four or more lines to a known profile increases the likelihood of an accurate classification.

**FILTER:** Toggles the Automatic Filter On and Off. Green indicates the Filter is on. The only names that appear in the list are of those with a similar frequency profile to that in the selected beam. When OFF all known profiles are in the list.

**APPLY:** Click to apply the class indicated in the Filter list to the tag (contact) currently seen in the Single Beam for the selected trace. This automatically applies the selected class to this track when it is selected in the Nav Screen DDI and applies that 3D model to the contact when viewed in the 3D View.

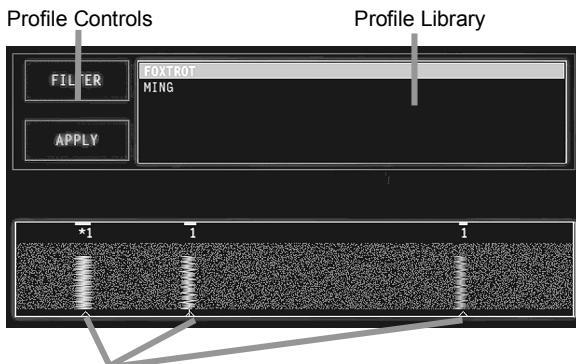
- ✓ Note: The tag must be marked and a trace line must be selected in the Single Beam display before a class can be successfully applied.

## **Classifying a Contact with the Frequency Profile Library**

The contact must have at least three detected frequencies before a classification is possible. When no lines are visible the profile Library is not available.

1. Click on a contact (frequency line) to select it. The vertical cursor line appears below the contact in the waterfall display.
2. Click MARK to assign a track number to the selected contact and send data to the Nav Map and the TMA station.
3. Click FILTER to weed out all but the profiles that most closely match the currently detected frequencies. Carets at the bottom of a display window represent the frequencies that make up the sound profile of the selected class.
4. Click in the Library list then press up and down keyboard arrow keys to scroll through the list of profiles. Note the location of the carets in the display window as each profile is selected.

5. Compare the location of the carets with the trace lines of the detected contact. When the carets line up exactly with the detected frequencies in the display windows, it is likely that the detected contact is of the class selected in the profile library. (Beware that some classes have very similar profiles so the process is not 100% foolproof.)
6. Click on a trace line to select it. A short line cursor appears under the trace indicating it is selected.
7. Click APPLY to assign the class of the currently selected profile to the selected contact. The class name appears in the DDI when the contact is selected on the Nav Map. The appropriate 3D model is also used in the 3D view whenever the contact is selected.



Profile indicators for FOXTROT (selected in the Profile Library)

### **FFG Towed Array - Single Beam Profile Library**

#### **Single Beam Mode DDI**

**ARRAY HEADING:** Current heading of the towed array.

**ARRAY DEPTH:** Current Depth of the towed array in feet.

**CRSR FREQ:** The frequency at the location of the cursor.

**CRSR TRACK:** If the frequency has been marked (assigned a track number) the track number appears in this field when the cursor is held over the trace line.

**SLAVED TO TAG:** The display can be set to follow a tag to other beams. The tag number of the frequency the display is currently following is seen here when a tag is slaved.

**BEAM:** The beam number currently viewed.

#### **Single Beam VAB Panel**

**MARK:** Click to mark the selected frequency tag and send the Beam bearing information to the Nav Map and TMA stations.

**ASSIGN ATF:** Click a frequency trace line in the display then click ASSIGN ATF to assign an Automatic Tag Follower (ATF) to the

selected contact (or frequency). A tag follower automatically updates information on the assigned target to the Nav Map and the TMA station.

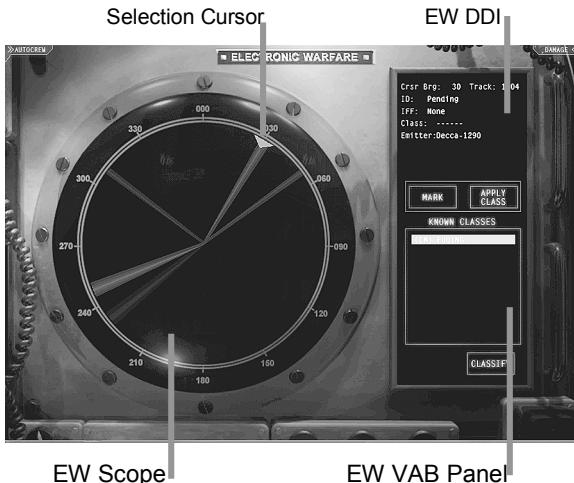
**SLAVE TO TAG/UNSLAVE FROM TAG:** Click on a detected frequency trace line (Tag) then click SLAVE TO TAG to assign the display to follow that Tag if/when it moves to a different beam. When a Tag is slaved, the VAB changes to UNSLAVE FROM TAG whenever the cursor is over that contact.

- ⇒ Click UNSLAVE FROM TAG to free the display from following that specific Tag.

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## FFG ELECTRONIC WARFARE (EW)[F7]

The Electronic Warfare (EW) station is used to mark and classify electronically detected contacts. Each type of radar emits recognizable signals. Once an emitter is detected, a list of ship or aircraft classes known to have that emitter is provided in the Known Classes list. Contacts can be marked immediately. Once the probable ship or aircraft class and alliance classification of a contact is known, it can also be classified in the EW VAB Panel.



### EW SCOPE

Each sweep of the EW antenna displays on the EW Scope any detected radar emissions on the bearing indicated. Contacts are seen as narrow wedges of orange varying in size and intensity depending on the strength of the contact. The triangular cursor is used to select a contact for further examination and classification on the VAB Panel.

### TO Mark a Contact in EW

1. Click on a contact in the scope to select it.

2. Click MARK to assign a track ID to the contact and send bearing data to the Nav Map and TMA stations.

### **To Apply a Class Name to a Contact in EW**

1. Mark a contact as described above.
2. Scroll in the Known Classes list to find the probable country/class of the contact.
  - The two-digit code that appears in front a class name represents the country for that instance of the class.
  - The letter-code after aircraft class names represents the designation of the aircraft (See list below.)
3. Click the class name in the list to select it. The APPLY CLASS button is activated.
4. Click APPLY CLASS to apply this class designation to the contact. Class name assigned here appears as the DDI class field here and in the Navigation Station DDI. The 3D model associated with that Class name is used for the contact whenever the contact is selected on the Nav Map.

### **To Classify a Contact**

1. Click on a contact in the scope to select it.
2. Click CLASSIFY.
3. Click one of the alliance designations listed. (Be aware that designating a contact as HOSTILE or UAH (Unknown Assumed Hostile) can result in attacks on the platform by Ownside's Link participants.) See *EW VAB Panel/Classify* below.
4. Click RETURN to activate the designation and display the EW VAB Panel.

✓ Note: The CLASSIFY button is not available if Show Truth is on

### **Aircraft Class Designations**

The following abbreviations are in use following Aircraft names in S.C.S. – *Dangerous Waters*.

AEW: Airborne Early Warning

ASW: Anti-Submarine Warfare

ER: Electronic Reconnaissance

EW: Electronic Warfare

F/A: Fighter Attack

H: Helicopter

Hyb: Hybrid

MP: Maritime Patrol

UAV: Unmanned Aerial Vehicle

## EW DDI

Information relative to the selected contact appears in the EW DDI.

**Crsr Brg:** Bearing at the location of the cursor

**Track:** Track number of the selected contact. Track numbers are assigned when a contact is marked.

**ID:** Displays the (alliance) classification selected via the CLASSIFY VAB below.

**IFF:** Identification Friend or Foe. This field displays Friendly, Civilian or None.

**Class:** Displays the class name designated with the APPLY CLASS button.

**Emitter:** Displays the name of the detected emitter. (The USNI browser lists sensors in use by most platform classes.)

## EW VAB PANEL

**MARK:** Click to mark the contact selected in the Scope. This assigns a track number and sends bearing information to the Nav Map and the TMA station.

**APPLY CLASS:** Click to apply the class name selected in the Known Class list to the contact selected in the Scope. This button is not active unless a name is selected in the list.

**CLASSIFY:** Click to designate an alliance ID to the selected contact. (This button is not available if Show Truth is ON.)

**PENDING:** Default classification. Equates to Unknown.

**UAH:** Click to designate the selected contact as Unknown Assumed Hostile.

**UAF:** Click to designate the selected contact as Unknown Assumed Friendly.

**HOSTILE:** Click to designate the selected contact as Hostile.

**FRIENDLY:** Click to designate the selected contact as Friendly.

**NEUTRAL:** Click to designate the selected contact as Neutral.

**RETURN:** Click to return to the EW VAB Panel.

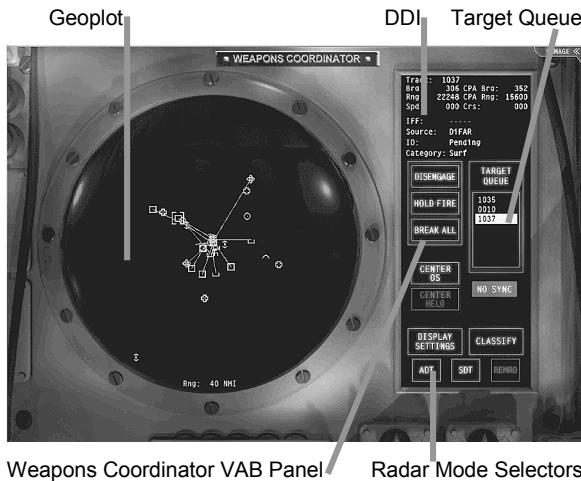
**KNOWN CLASSES:** Lists all classes known to use the detected emitter. Select a name in the list and click the enabled APPLY CLASS button to assign that class designation to the selected contact.

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## FFG WEAPONS COORDINATOR STATION [F8]

The Weapons Coordinator examines all available contact data and assigns contacts to the Target Queue for engagement at the Weapons Control

Station. Here the surface search and air search radars are activated and processed data is viewed.



## WEAPON'S COORDINATOR GEOPLOT DISPLAY

The Weapons Coordinator's Geoplot functions a bit differently than other FFG Geoplots. The view can be zoomed but it cannot be panned. It is always centered on either Ownship or its deployed helo. (The helo can only be centered if sync has been established and OS has control of the helo.)

✓ **Note:** While the Air (ADT) and Surface Search (SDT) radars are turned on and off here, you never see the actual raw radar returns. Only the processed returns are visible on the Weapons Coordinator Geoplot. The sweeps are used to indicate a) that a particular radar is ON and b) the nominal range of the activated radar.

All contacts detected by OS sensors as well as Link contacts (when Show Link Data is selected) appear on the Weapons Coordinator Geoplot. When OS is synced (linked) with its in-flight helicopter, the helo can be set to send its radar data to the FFG where the information is processed and detections are marked as FFG contacts. The type of data the helicopter sends is set in LINK MODE in the ASTAC Station. See REMRO below.

To change the range scale in the display use one of the following methods:

- ⇒ Click DISPLAY SETTINGS then click one of the range buttons in the range VAB Panel
- ⇒ With the cursor in the Geoplot roll the mouse wheel up to zoom in or back to zoom out.
- ⇒ With the cursor in the Geoplot press [CTRL] then click the display to zoom in or right-click to zoom out.

Clicking on a contact symbol in the Geoplot provides known information on the contact in the DDI.

- ✓ **Note:** The Geoplot range defaults to 40 nm. There may be Link contacts that are seen only when the range is zoomed out. If you are pressing [Tab] to move between contacts and the selection box is not visible on the Geoplot, check the DDI to make sure something is selected then zoom out until you can see the selection cursor.

## RADAR OPERATION

The Air Search and Surface Search radar scopes are not modeled as player interfaces in S.C.S. – *Dangerous Waters*, but the radars are turned on and off by the Weapons Coordinator. Contacts processed by the radars when they are on are automatically reported to the Nav Map and all Geoplots. In S.C.S. – *Dangerous Waters* radar reports are sent to TMA to allow for merging with passive contacts. (This cleans up the Nav Map.) The FFG's air and surface search radars are off by default. Orange text on a button indicates that radar is OFF.

- ⇒ Click **ADT** (Air Search) and/or **SDT** (Surface Search) to toggle the state of the specific radar. (Green indicates the radar is ON.)
- ❑ If Show Link is ON, the symbols representing the Link reported contacts and the radar returns are located on or nearly on top of each other. Contacts detected by other OS Sensors also appear on the Weapons Coordinator Geoplot thus it is possible to see contacts with lines of bearing.
- ❑ The sweep seen in the Geoplot when a radar is on indicates nominal the range of the radar.

## REMRO

The REMRO (Remote Radar Operator) button is not active unless an Ownship helo is aloft, sync has been established, OS has Helo Control and the helo has been set to send radar data to the ship as described below:

### To enable REMRO

1. Select the ASTAC Station [F3].
2. In the ASTAC Geoplot select the OS helo symbol. SYNC is established.
3. IN LINK MODE click RADAR. This orders your Deployed Helo to begin radiating.
4. Return to the Weapons Coordinator Station [F8] then click REMRO to receive the see the helo's Radar data. (In Multiplayer games when another player is controlling your in-flight helo, the helo player must turn the RADAR on before you can receive his data.)
5. Detected contacts are automatically marked as Ownship contacts as long as REMRO is ON.

✓ **Note:** Radar sends an update to the Geoplot and Nav Map every two minutes as long as the radar detects the contact.

## PLACING CONTACTS IN THE TARGET QUEUE

The primary purpose of the Weapons Coordinator console is to place appropriate targets in the Target Queue for prosecution from the Weapons Control Station. Unlike the controllable submarines, contacts need not be categorized by type (Air, Surface, Subsurface) in order to appear in the Target Queue. Unknown contacts as well as Link contacts and even Link participants can be placed in the queue.

✓ **Note:** Be aware that any contacts currently in the Target Queue are cleared if you toggle Show Truth. These contacts are not returned to the queue when the mode is returned to the original setting. You must re-enter the contacts.

1. Select a contact in the Geoplot. (If you are having difficulty selecting a contact see the TIP below.) When the selected contact is a valid target the ENGAGE button is activated. (The button is greyed when a non-valid contact is selected, for example OS helicopter and sonobuoys.)
2. Click ENGAGE. The Track ID of the contact is added to the Target Queue and is now available for weapon assignment in the Weapons Control Station.
3. Select a Track ID in the list and click
  - ❑ DISENGAGE to remove it from the Queue.
  - ❑ HOLD to notify the Weapons Control Station not to fire on this contact. (You are not prevented from firing on a contact that has a hold. This is used in Multiplayer Multi-Station mode to notify the Weapons Control player to check with the Weapons Coordinator before engaging the contact.)
  - ❑ BREAK ALL to remove all contacts from the Target Queue.

✓ **Note:** Submarine contacts must be added in the Weapons Coordinator Station to be available in the Target Queue in the Torpedo Control Station.

**Tip:** Because scroll and zoom are limited in the Weapons Coordinator Geoplot it is difficult to select separate symbols when multiple sensors are reporting the same contact. Press [Tab] to move between contacts. Check the DDI for the source of the report to determine when an OS reported contact is selected. If the Geoplot is zoomed the selected contact may be off the screen. Zoom out before tabbing. From the Nav Map you can also Hide Link Data to better see your own contacts.

## WEAPONS COORDINATOR DDI

The following information is available in the DDI on a contact selected in the Weapons Coordinator Geoplot:

**Track:** Track number of the selected contact.

**Brg:** True bearing of contact.

**Rng:** Range in yards from Ownship.

**Spd:** Speed in knots.

**IFF:** Identification Friend or Foe. Aircraft only are identified as Civilian, Friendly or Unknown.

**Source:** The sensor or other source reporting the selected contact.

**ID:** Alliance as assigned by the player. Pending indicates unknown or not yet specified.

**Class/Category:** Type of platform (Surface, Air, Sub). Actual class name appears for Ownship and Ownship's helicopter at all times and for all platforms when Show Truth is ON.

- Any contact detected by the surface search radar is assigned Category: Surf. Any contact detected by the Air Search radar is assigned Category: Air. If the radar misclassifies a contact, select the contact and click CLASSIFY. Then click AIR or SURF as appropriate.

**CPA Brg:** Projected true bearing of the selected contact when it reaches its closest point of approach (CPA) to Ownship (given current course and speed of Ownship and selected contact.)

**CPA Rng:** Projected range of the selected contact when it reaches its closest point of approach (CPA) to Ownship (given current course and speed of Ownship and speed selected contact.)

**Crs:** Course of selected contact.

## WEAPONS COORDINATOR VAB PANEL

The weapons coordinator activates the RADAR and manipulates and selects contacts in the Geoplot for placement in the Target Queue. The following buttons are used to place contacts in the Target Queue or remove them from the queue. A target in this queue is easily targeted in the Weapons Control Station.

### TARGET QUEUE Controls

**ENGAGE:** Click to place the selected contact into the Target Queue. When the selected contact is already in the Target Queue, the DISENGAGE button is active. This button is not activated if no contact or an invalid target is selected (OS, OS Helo, sonobuoys, torpedoes).

**DISENGAGE:** Click to remove the selected contact from the Target Queue.

**HOLD FIRE:** Click to place a Hold Fire on this target. Brackets appear around track numbers in the Target Queue when a hold fire is ordered. Click again to remove the Hold Fire designation.

- The Hold Fire designation can be over-ridden in Weapons Control [F10] but serve as a reminder for the Weapons Control player in

Multi-Station mode to check with the Weapons Coordinator before engaging this target.

**BREAK ALL:** Click to remove all targets from the Target Queue.

**TARGET QUEUE:** Lists the track numbers of all contacts designated with the ENGAGE button. Targets designated here appear in the Target Queue in the Weapons Control Station [F10]. Surface and subsurface contacts placed in the list appear in the Torpedo Station Target Queue.

**NO SYNC/SYNC:** Indicates the current state of link between Ownship and Ownship's airborne helicopter. (Sync is set in the ASTAC station.)

## Geoplot Controls

**CENTER OWNSHIP:** Click to center Ownship in the Geoplot. (Ownship is always centered unless the OS helicopter is centered.)

**CENTER HELO:** Click to center Ownship's helo in the Geoplot. The helo can only be centered when Sync is established from the ASTAC station.

**DISPLAY SETTINGS:** Click to display the Geoplot range selection buttons.

**Range Buttons:** Click to set the effective radar range for the selected radar (10, 20, 40, 80, or 160 nautical miles.) (The surface radar (SDT) has a maximum range of 40 nm.)

**BACK:** Click to return to the previous VAB Panel.

## Radar Controls

Each of the Radars is represented by an individual single-sweep. The length of the sweep represents its nominal range. Ownship's air and surface search radars emanate from the OS symbol. REMRO's single-line sweep emanates from the helicopter symbol.

**ADT:** Click to turn ON/OFF the air search radar (AN/SPS-49.)

**SDT:** Click to turn ON/OFF the surface search radar (AN/SPS-55.) The maximum range of the surface radar is 40 nautical miles.

**REMRO:** (Remote Radar Operator) Click to view the sweep and from your in-flight helicopter. This option is only available when the helo is aloft and SYNC is established in the ASTAC Station. The in-flight helicopter must be set to RADAR in the Link Mode section of the ASTAC VAB Panel.

Green text on these buttons indicates the radar is ON. Contacts are no longer updated when a Radar is off.

## CLASSIFY

The Classify function in the Weapons Coordinator Station is used to classify a contact selected in the Geoplot. Only contacts detected by Ownship's

sensors can be classified. When a Link or Truth contact is selected, the Classify button is unavailable.

**CLASS (Category):** Class is selected by default. Click the desired category to assign that category to the selected object or platform. The selected name appears in the Category field in the DDI. The selection affects the shape of the NTDS symbol shape on the Geoplot and Nav Map.

- ✓ **Note:** The **Category** label in the Weapons Coordinator DDI changes to **Class** when Truth objects are selected. (Ownship and OS helicopters are always reported as Truth.) See Main Menu/Options/Game>Show Truth for information on the Truth objects. When Show Allies is selected in the Game Options screen, any selected allied contact is reported as Truth. When Show Truth is selected in the Game Options, the true class of any selected object appears in the Class field of the DDI.)

**STATUS (ID):** Click STATUS to display a selection of alliance IDs. Click the desired alliance designation to assign it to the selected contact. This choice displays in the ID field in the DDI when this contact is selected.

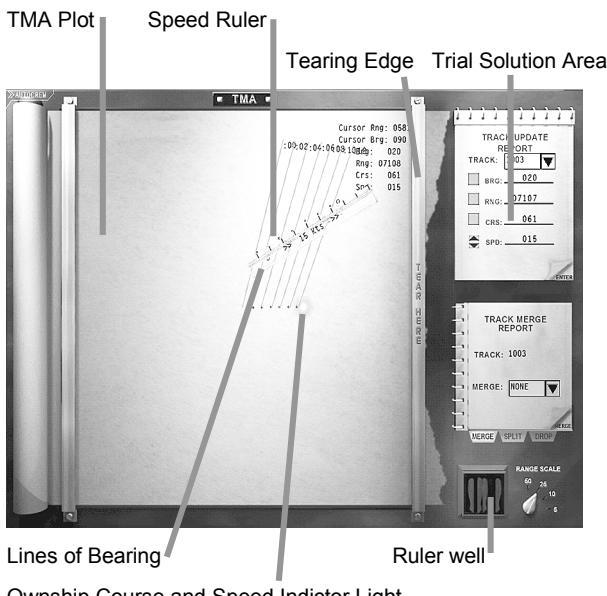
**BACK:** Click to return to the Main Weapons Coordinator VAB panel.

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## FFG TMA STATION [F9]

Target Motion Analysis (TMA) is used to determine the most likely bearing, range, course, and speed of surface and subsurface contacts within range of the ship's sensors. This information, also called a solution, is used to accurately target hostile contacts and also to avoid collision with other vessels. TMA is not simple. The basic steps for performing TMA are found in Training/TMA Basics in this manual. A description of the FFG's TMA station and information on using the FFG's unique TMA Plot are found here.

Until you get the hang of TMA you might want to turn your TMA Autocrew on while you are at other stations.



### FFG TMA Station

## THE TMA PLOT

The TMA Plot in the FFG is modeled after a Dead Reckoning Tracer (DRT.) It plots bearing and range returns (when available) of contacts detected and marked by Ownship's sensors. Unlike the digital TMA displays in the submarines, the FFG in S.C.S. – *Dangerous Waters* does it the old fashioned way, on paper. A speed ruler is used to determine the most likely speed, course and range of the contact.

A contact must be selected in the TRACK drop-down list on the Track Report Update tablet and at least one line of bearing must be visible on the TMA Plot before a speed ruler is visible. A contact must be marked by one of Ownship's sensors before it appears in the track list.

- ✓ **Note:** Normally visual and radar contacts would not be marked on the TMA plot; however, in S.C.S. - *Dangerous Waters* the track numbers for *all* contacts marked by your FFG sensors appear in the TMA list to facilitate merging tracks and cleaning up the 3D View. Link participants and Link contacts do not appear in the TMA track list.)

**Automatic Updates:** When a contact is assigned a tracker (an ATF in the Towed array or the ATT in Hull active sonar) update reports are sent to TMA every two minutes. When the Towed Array and EW Autocrew are on,

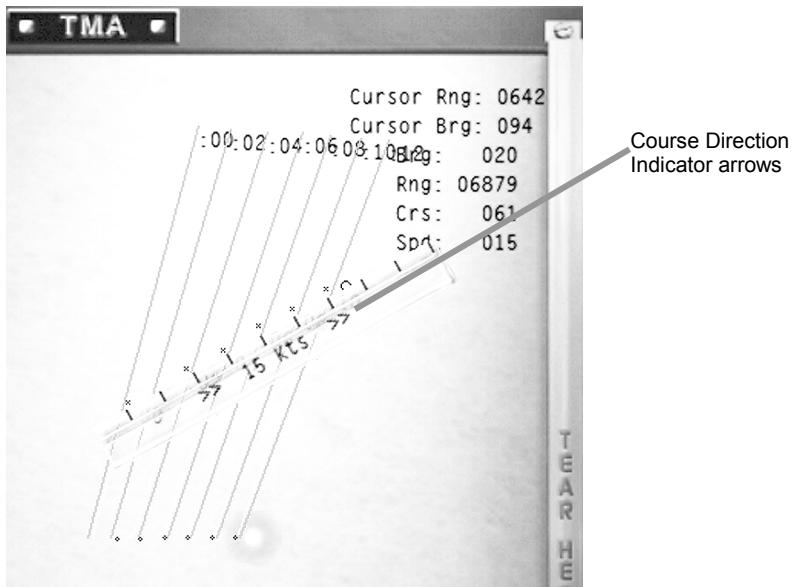
updates are also sent to the TMA station. Contacts marked by the FFG Lookout and radar (when it is on) are also updated every two minutes.

**Manual Updates:** Since there are a limited number of trackers that can be assigned to contacts in the FFG, you may want to manually re-mark contacts that have not been assigned trackers. If a two-minute interval has not passed before you re-mark a given contact, a new line will not appear on the TMA plot for that contact. Be sure to wait a full two minutes. Note the time on the most recent LOB when deciding when to re-mark a contact.

**Viewing Updates:** While tracks that have been assigned trackers or are updated by Autocrew are always being updated, the newly reported LOBS are only added to the plot when the track is reselected. If a track is selected in the dropdown list its updates appear as you watch.

## TMA Speed Rulers

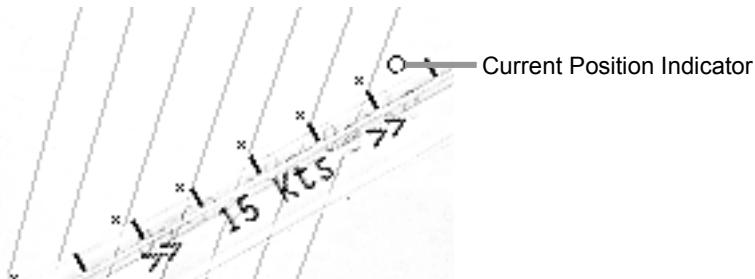
The FFG's TMA speed ruler is depicted as a clear plastic ruler with fixed tics indicating two-minute intervals at the speed indicated on the ruler. The FFG's speed ruler does not stretch as the digital speed strips in the submarine TMA stations; it must be swapped to try different speeds. A ruler is swapped by selecting a different speed in the SPD field in the Track Update Report.



### Using the FFG TMA Speed Ruler

1. Click on the center of the ruler and drag it to move the ruler to a new location.
2. To move an end of a ruler, click and drag the desired end of the ruler.

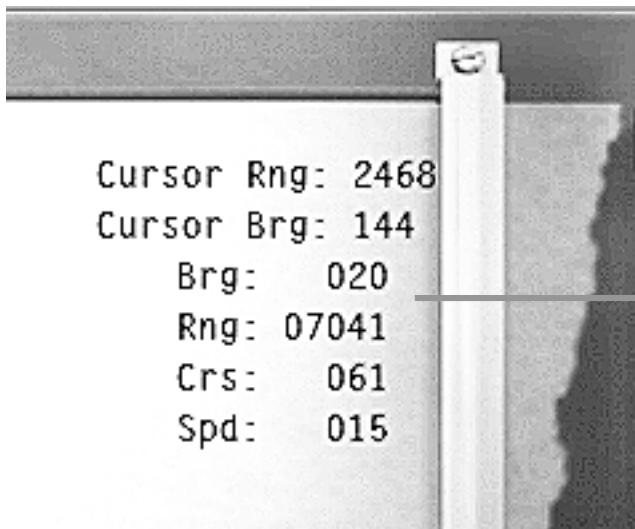
3. To select a different speed ruler click or right-click in the speed field of the Track Update Report.
4. To indicate course: Arrows on either side of the selected speed noted on the ruler indicate course direction. It is not necessary to have the extreme left tic be on the oldest line, just be aware that the course of the track is indicated by the arrows. Click and drag the end of the ruler to place it in an orientation that depicts your best guess as to the course of the contact.
5. Note the location of the tiny circular Current Position Indicator. Given the course, range and speed indicated by the ruler position, and the last sensor report, the tiny circle marks the probable current position of the contact.



✓ Note: The towed array picks up low flying aircraft. When the TMA Autocrew is ON you may see ruler speeds in excess of 50 knots. This is the Autocrew's attempt to analyze the data from the detected aircraft.

### **Cursor Position and Solution Readout**

In the upper right corner of the TMA Pot is a readout of the cursor bearing and range. Once a solution is entered for the selected track the entered range, bearing, speed and course of the contact appear beneath the Cursor location information whenever that contact is selected. See Training/TMA Basics for information on generating solutions.



Solution entered in Track Update Report for the selected contact.

### ***Ownship Course and Speed Indicator Light***

A bright pinpoint light shines through the TMA Plot paper to represent Ownship position. This light moves corresponding to Ownship's course and speed; when the light reaches the edge of the paper, it begins blinking. The sheet must be removed to again center the OS light in the center of the TMA Plot. Click TEAR HERE to remove the sheet.

Be aware that all contact bearing lines, the track history of all contacts, is lost when the page is removed. When TMA Autocrew is on he automatically tears the sheet when the light reaches the edge of the paper. You must remark contacts that are not assigned ATF or ATT trackers and re-select a Contact ID before new LOBs appear on the plot.

The scale of movement of the Ownship marker is changed by selecting the desired range (in nautical miles) with the RANGE SCALE switch at lower right of the TMA Station.

### ***Lines of Bearing***

When a contact's track number is selected in the Track Update Report, the bearing data for that contact appears on the TMA Plot as a line of bearing or multiple lines of bearing. Depending on the sensor, reports update at regular intervals. Towed Array passive sonar contacts update every two minutes when an ATF tracker is assigned. Active Sonar has one tracker (ATT) that, when assigned, sends a report every two minutes.

- ✓ **Note:** In S.C.S. – *Dangerous Waters* the FFG's radar, when ON, reports a contact to the TMA Plot as a line of bearing ending with a tiny x at the range of the contact. The Lookout's visual reports are also reported to the TMA Plot. This allows you to merge visual and radar contacts, which provide range information, with passive

contacts, which consist of a line of bearing in order to “clean up” the Nav Map. Radar reports are updated in two-minute intervals. Lookout reports also update with an LOB every-two minutes; however, because the Lookout reports frequently, a tiny x at the reported range appears on the TMA screen between LOB reports. This gives you an indication of the contact’s course.

Sensor data is color-coded according what type of sensor is reporting the contact. LOB colors are shown in the chart below:

### FFG LOB colors

Towed Array:	Magenta
Active Sonar:	Green
Hull Passive Sonar:	White
Sonobuoy, Passive:	White
Sonobuoy, Active:	White
EW:	Red
Radar:	Yellow
Lookout:	Red

- Each LOB is time stamped with the time in the mission at which it was marked or reported. The time stamps appear on the TMA Plot beside each LOB. It is sometimes difficult to view all the times when zoomed out all the way.
- When the contact is within the currently displayed range scale, lines of bearing reported by active sonar, the lookout, and radar end with a tiny x at the range reported.
  - ⇒ Click on a Line of Bearing to see the track number associated with the bearing report.
  - ⇒ Right-click on a line to erase it. A faint remnant remains, as does the time stamp.

### Tearing Edge

When the Ownship Course and Speed Indicator light reaches the edge of the paper it is necessary to tear off that sheet and reset the Ownship marker to the center of a clean page.

- ⇒ Click TEAR HERE to center the Ownship Course and Speed Indicator on a clean piece of paper in the TMA Plot.
- Be aware that tearing off the page removes the line of bearing history for all contacts. After the sheet is torn, you will need to remark manual contacts before they will again appear on the TMA plot. Tracks that are assigned ATF and ATT trackers, screens with activated Autocrew, and Lookout and Radar sensors will automatically begin to send new reports after a two-minute interval.

- ❑ When Autocrew is on he will automatically tear the paper when Ownship reaches the edge of the paper. If you zoom the display such that the Ownship Course and Speed Indicator is off the paper while Autocrew is on, he automatically tears the sheet.

**Tip:** If you have a good solution for a contact, be sure to enter it *before* tearing off the sheet. Be aware that once entered a solution stays in effect even after the sheet is torn off. Once the sheet is replaced, you can refine the solution by changing the digits in the trial solution area and clicking ENTER again.

## TMA ON FFG CONTACTS WITH A REPORTED RANGE

The sensors that provide range data, in addition to bearing information, are the Hull sonar and sonobuoys in Active mode, the forward and aft Lookouts, and Air Search and Surface Search Radars. Contacts marked by these sensors appear on the TMA Plot as a bearing/range pair. What you see is a bearing line ending with a tiny x at the detected range of the contact for each report from these sensors.

If the target's bearing and range are known at two different times, as may be the case with these sensors, the solution can be found by connecting dots and "creating a line" with the ruler for course and speed.

A sonobuoy in active mode provides returns from the location of the buoy rather than from Ownship on the TMA plot. Hull active sonar, Lookout and Radar contacts, appear at the end of a line of bearing from the location of the Ownship indicator light at the time of the report.

### To determine a solution for contacts with a reported range

1. Identify and mark a contact with active sonar either at the Hull Sonar Station or from returns from a DICASS buoy in active mode. (See FFG Hull Sonar and FFG Acoustic Station sections of this manual for more information on marking contacts in those stations.) Lookout and Radar contacts are marked automatically. Find the track number of the contact in the TRACKS dropdown in the Track Update Report tablet at the TMA Station.
  - ❑ Only contacts detected by Ownship's sensors appear in the list. The track numbers for Link participants and Link Contacts do not appear in the TMA list.
  - ❑ Active sonar returns from the hull sonar and sonobuoys appear on the TMA Plot with green lines of bearing.
  - ❑ Radar contacts appear on yellow lines of bearing.
  - ❑ Lookout contacts appear on red lines of bearing.
  - ❑ When these sensors report a range, the line of bearing ends with a tiny x at the range reported. The x appears only if the range is within the current TMA Plot range scale setting.

2. One ATT (tracker) can be assigned to an active contact in the Hull Sonar active mode. If no ATT is assigned to the track, mark the contact again after a two-minute interval. Continue to mark the contact at two-minute intervals to accumulate several bearing lines. Toggle back and forth between the TMA and your chosen sensor.
3. The Lookout and Radar lines of bearing update automatically at two-minute intervals. The Lookout also sends tiny x marks with no attached line of bearing between the two-minute intervals.
4. Zoom the TMA Plot range if possible to get as clear a view as possible of the x marked ends of the bearing lines. Because of the restrictions of the FFG TMA plot, it is often not possible to zoom in and still see the ends of the lines.
5. Click in the Speed field of the Track Update Report to change the speed of the ruler until you find a ruler with tics that line up with the x marks at the ends of the lines.
6. Position the tic edge of the ruler along the x marks at the ends of the bearing lines such that the direction arrows are pointing in the direction the contact is heading.
  - ⇒ Click the center of the ruler and drag it to move the entire ruler in its current orientation.
  - ⇒ Click an end of the ruler to drag that end. Make sure the arrows on the ruler are pointing in the direction of the most recent LOB.
7. Change the ruler speed as needed until you find one that best matches the end points of the x marked lines of bearing. When you have the best match, click ENTER under the folded corner of the Track Update Report at the bottom right of the tablet to enter your solution.

The solution (consisting of the speed, course, range and bearing indicated by the ruler and its position) is entered in the system and appears in the upper right of the TMA Plot whenever the contact is selected.

On the Nav Map, the LOB for that contact is removed and the contact symbol now moves on the course and at the speed dictated by the solution you entered.

## **TMA ON FFG PASSIVE SONAR AND EW CONTACTS**

A more complex situation arises when only the contact's bearing is known, as is the case with passive sonar and EW reports. In the FFG up to eight ATF trackers can be assigned to passive contacts in towed array. If your EW Autocrew is on, EW contacts are reported to TMA automatically; if OFF, you must mark the contacts and update them yourself. There are no trackers of any kind for sonobuoys or hull passive sonar contacts.

Contacts detected by a sonobuoy in passive sonar mode are displayed from the location of the sonobuoy on the TMA board and in the Nav Map and Geoplots. Towed array contacts display from the location of the towed array (approximately a mile behind of the ship.)

## To perform TMA on passive sonar contacts:

1. Select a contact to analyze. Passive contacts have colored LOBS as noted: **EW**: Red; **Hull passive and passive sonobuoys**: White; **Towed Array**: Magenta. The lines of bearing end at a default range. The length of the default line is not an indication of the actual range of a passive contact. You must determine that for yourself. The contact may be beyond the default range of the line. You can position the ruler beyond the LOBs if you suspect that is the case.
2. When you have several lines of bearing, determine if the Lookout has reported the contact or if you have the same contact on active sonar or radar, and merge them. This can be very useful if you have a good range from active sonar and a good bearing history from EW or passive sonar. When a contact is merged, both reporting sensors update at about the same time when the merged contact is selected in the TRACK list. Updates are only seen for the contact that is selected.
  - The FGG is noisy making it difficult to hide your location from a sub, which is no doubt aware of your presence long before you are aware of his. Because of that, using your active sonar is not the disadvantage to you as it is to a sub that is trying to maintain stealth.
3. Enter any known data in the trial solution data fields. If you have additional data on the contact's range, or course, for example from an intelligence message, enter it in the appropriate solution field. If you have determined the contact's speed using DEMON, enter that speed in the solution field.
4. Select a speed for the ruler and position the ruler to create possible solutions for the LOB data you see. The current ruler position is reflected in the BRG, RNG, CRS and SPD fields in the Trial Solution Area in the Track Update Report.
5. If you are sure about one aspect of the solution (e.g. range) enter that value directly into the Range field then lock the field. That keeps you from dragging the ruler to a different range. To lock a field, click the check box associated with the field.
6. When you think you have a plausible solution click ENTER at the bottom right corner of the Track Update Report.
  - The solution is entered into the system. The system tracks the estimated position of the contact based on this solution and uses that estimated location when targeting the contact. The LOB is removed from the contact on the Nav Map and the map symbol moves at the course and speed designated in the solution.
7. Change course and/or speed. When analyzing passive contacts it may be necessary to maneuver to gain additional information. Changing your course and/or speed can refine the TMA solution. This changes the relative motion between your ship and the contact. After steadyng on the new course and/or speed, adjust the ruler to achieve the best fit.

This second “leg” should help to eliminate solutions that are unreasonable. A third “leg” or more will refine the solution further.

- ❑ Remember that the Towed array is dragged a mile behind the ship. It will take some time for it to straighten out.
- ❑ If one TMA solution does not fit the entire observed bearing data, consider the fact that the contact itself may have changed course and/or speed. You may want to disregard the earlier lines of bearing and concentrate on the most recent returns.
- ❑ Tearing the sheet removes the data for all contacts. Reselecting a contact does not return old data to the plot. You must mark contacts again. If trackers are assigned, they will begin updating again after a two-minute interval.

## TRACK UPDATE REPORT

The fields of the Track Update Report sheet are described here:

**TRACK:** Displays the track number of contacts detected Ownship's EW, Towed Array, Active and Passive Sonar sensors and sonobuoys.

**BRG:** Displays the true bearing to the contact as of the last sensor report.

**RNG:** The range (in yards) from Ownship based on the location of the ruler on the most recent Line of Bearing.

**CRS:** The course of the track based on the direction of the Speed Ruler.

**SPD:** Indicates the current speed in knots in use on the Speed Ruler. Changing the digits in this field results in new speed ruler on the TMA Plot. The speed indicated on the ruler is the speed that is entered into the solution.

⇒ Click the up and down arrows to the left of SPD to select a ruler that indicates a higher or lower speed.

**ENTER:** Under the upturned corner of the Track Update Report sheet click ENTER to enter the solution indicated by the placement of the speed ruler.

## TRACK MERGE REPORT

When different sensors detect the same contact it is sometimes helpful to merge those contacts to help reduce clutter on the Nav Map and merge all incoming data into one TMA solution. With information from more than one sensor displayed together on the TMA Plot it is sometimes easier to pinpoint the exact range.

The lower tablet provides the means for Merging, Splitting and Dropping tracks by using the tabs described here. The components of the Track Merge report are described here:

**TRACK:** Displays the track number of the Track selected in the upper Track Update Report TRACK dropdown list.

**MERGE Dropdown:** Displays all track numbers but the one listed in the TRACK field. Select one of these tracks to merge with the track listed in the TRACK field.

**MERGE corner:** Click this text that appears under the folded corner of the page to complete the merge of the two tracks selected in the TRACK field and the MERGE dropdown.

## To Merge a Track

1. Click the MERGE tab in the lower tablet.
2. Select the primary track from the TRACK dropdown in the Track Update Report sheet. This automatically places the primary track number in both the Track update Report and the Merge Track Report TRACK Fields.
3. Select a secondary track from the MERGE dropdown list to merge with the primary track.
4. Click MERGE in the folded corner of the Merge Update Report sheet to perform the merge. The track that was selected in the merge dropdown no longer appears in the Track list. The returns from the reporting sensors of both the primary and secondary tracks now list the track ID number of the primary track.

## TRACK SPLIT REPORT

Occasionally you may have merged two contacts in error or desire to split a merged contact back into two separate components.

## To Split Merged Tracks

1. Click the SPLIT tab in the lower tablet.
2. Select the merged track to be split in the TRACK dropdown in the upper Track Update Report. This automatically places that merged track number in the Track Field of the lower tablet.
3. Click SPLIT under the folded corner of the sheet to perform the split. The merged track is split into its original components and their original track numbers are restored.

## TRACK DROP REPORT

Occasionally you may want to drop a contact that is of little interest or is moving out of range.

## To Drop a Track

1. Click the DROP tab in the lower tablet.
2. From the TRACK dropdown in the upper Track Update Report select the Track number to be dropped. This places the track number in the TRACK field in the lower Track Drop Report sheet.
3. Ensure that the track you want to drop is the one that appears in the Track Field.

4. Click DROP under the folded corner of the sheet to perform the drop. The Track number is removed from the system. The track may reappear if you or your Autocrew remark it.

## RANGE SCALE

The control switch in the lower right of the station interface controls the range that appears in the TMA Plot. Click the number of the desired scale. Numbers indicate nautical miles. Because the TMA plot can only be zoomed in on dead center, the ends of the lines of bearing are frequently out of view when zoomed.

## FFG WEAPONS CONTROL STATION [F10]

The Weapons Control Station is used to launch SM-2 and Harpoon missiles, and train and fire the Mk 75 (76 mm) gun and the Close In Weapons System (CIWS). The Weapons Control VAB panel has four modes, Missile Control, Gun Control, Harpoon Planning and CIWS Control. These modes are navigable by buttons at the bottom of the VAB Panel. The default view is Missile Control. Common to all modes is the DDI, the Target Queue and the navigational buttons.

✓ **Note:** Be aware that any contacts currently in the Target Queue and all assigned targets are cleared if you toggle Show Truth. These contacts are not returned to the queue when the mode is returned to the original truth setting. You must re-enter the contacts.



## WEAPONS CONTROL GEOPLOT

Ownship and all contacts inside the selected range scale including those reported by Link participants and the Link participants themselves appear on the Geoplot. Geoplot symbols may periodically jump or move when updated by Link sources.

- ⇒ Use the mouse wheel or press [CTRL] plus left and right mouse clicks to zoom in and out when the cursor is in the Geoplot.
- ⇒ Click and drag in the Geoplot to pan the display. Be aware that you can drag all selected contacts entirely out of the display and it can be difficult to find them again.

When a contact is selected in the Geoplot, information on the contact is seen in the DDI at the top of the VAB Panel. Cursor bearing and range is displayed in the DDI whenever the mouse is in the Geoplot display.

## **WEAPONS CONTROL DDI**

The following information is available on a contact selected in the Geoplot.

**Track:** Track number of the contact.

**Source:** Name of the reporting sensor.

**Brg:** True bearing of contact as reported by sensor or as entered at the TMA solution.

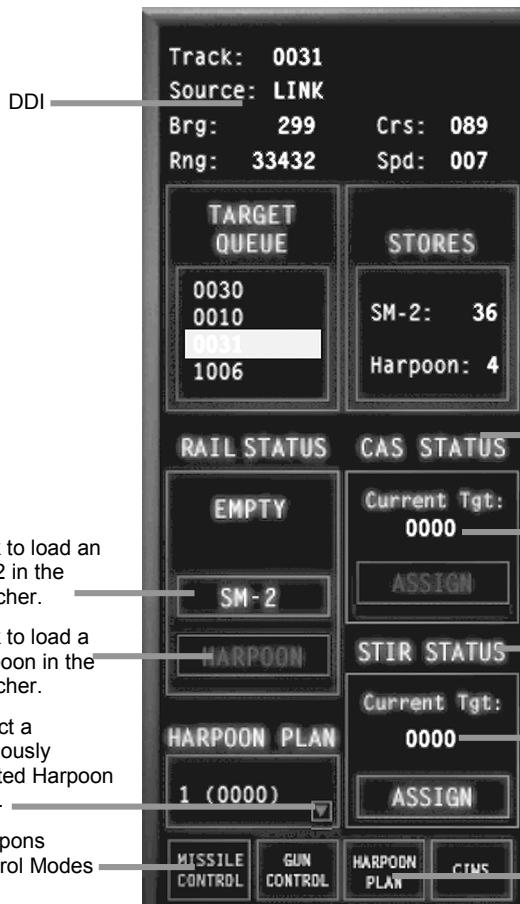
**Rng:** Range of contact as reported by the sensor or as entered in the TMA solution.

**Crs:** Course of contact as determined by the reporting sensor or as entered in the TMA solution.

**Spd:** Speed of the contact as determined by the reporting sensor or as entered in the TMA solution.

## **MISSILE CONTROL PANEL**

Depending on the missile selection, different button modes appear. The following button configuration is seen by default in Missile Control Mode:



**TARGET QUE:** Lists all contacts designated as high priority targets by the Weapons Coordinator. Targets can be selected directly from the Weapons Control Geoplot and do not need to be in the Target Queue.

**STORES:** Lists the current number of SM-2 and Harpoon Missiles.

**RAIL STATUS:** Indicates the status of the missile launcher. Text in the Status field changes according to which missile is selected. Status is EMPTY until SM-2 or HARPOON is loaded.

- ✓ **Note:** You cannot fire a Harpoon or SM-2 missile at a target that is behind Ownship.

**SM-2:** Click to load an SM-2 missile. Several Variable Action Buttons (VABs) appear during the launch procedure of an SM-2 missile. The complete steps needed to successfully launch an SM-2 describe the VABS that appear in the process.

**HARPOON:** Click to load a Harpoon missile. The HARPOON button is disabled unless you have created a HARPOON PLAN in the Harpoon Plan Panel.

- ✓ **Note:** Be sure to understand the steps before clicking HARPOON. The Harpoon must be launched or jettisoned once it is warmed. It cannot be returned to stores.

**HARPOON PLAN:** Click arrow to cycle through all available Harpoon Plans. The assigned track appears in parenthesis following the plan number. Plans with no assigned track are greyed out. Select a Plan number to assign to the Harpoon on the rail. The next Harpoon that is launched follows the plan selected here. A Harpoon Plan is created in the Harpoon Plan Panel. Click the HARPOON PLAN button in the Weapons Control Navigation buttons to access the Harpoon Plan Panel.

**CAS STATUS/ STIR STATUS:** Two fire control radars are available on the FFG: **CAS** (Combined Antenna System) and **STIR** (Separate Track & Illumination Radar). CAS can guide SM-2 missiles or control the gun. STIR can only guide the SM-2 missile. A fire control radar can track only one target at a time. The Harpoons do not require a fire control radar assignment.

Both the CAS and STIR STATUS areas allow for assigning (and de-assigning) a radar system to a target and for shutting down the missile once it is launched.

**Current Tgt:** Lists the track number of the target assigned to the specified radar.

**ASSIGN:** Click ASSIGN to assign the target selected in the Geoplot or in the Target Queue to the specified radar. VAB changes to DEASSIGN. Fire Control Radar begins illuminating the target.

**DEASSIGN:** Click DEASSIGN to turn off the fire control radar and un-assign the target. Once the missile is launched this VAB changes to CWI.

**CWI:** (Continuous Wave Illumination) CWI replaces the DEASSIGN button in the CAS or STIR STATUS area once the missile it is guiding is airborne. Turning off radar illumination signals the missile to shut down. Once clicked, the assigned missile is destroyed and the CWI button returns to its ASSIGN state.

### **To Launch an SM-2 Missile:**

1. Select a target from the Target Queue or click on a target on the Geoplot.
2. In the RAIL STATUS area click SM-2. This initiates the loading and warming process. Current progress status flashes in the RAIL STATUS area ending with READY SM-2. The RETURN button is activated.
  - ⇒ Click RETURN to return the missile to stores. The missile can be returned at any point before launch.

3. When ready to launch the missile click ASSIGN in the STIR STATUS areas. This assigns that fire control radar to the target selected in the Target Queue or the Geoplot. The ASSIGN button changes to DEASSIGN. (While the SM-2 can be guided with both the STIR and the CAS, the STIR cannot be used with the Gun, therefore assign the STIR to an SM-2 first to leave the CAS available for the gun. You are prevented from assigning an SM-2 to the CAS unless the STIR is currently guiding an SM-2 in the air.) Click DEASSIGN to turn off the fire control radar and de-assign the selected target.

✓ **Note:** The fire control radar begins radiating as soon as the target is assigned and can be picked up by enemy ESM. That announces you have hostile intent.

4. Once a fire control radar is assigned to the target, the FIRE button is activated. Click FIRE. The COMFIRM VAB appears. (If a radar is assigned to the target before the missile is loaded, the fire button enables as soon as the missile loads.) If the FIRE button never enables when you have a target assigned, the target may have already been destroyed.
5. Click CONFIRM within five seconds to launch the missile. RAIL STATUS updates to FIRING SM-2 until the missile is away. If you fail to click CONFIRM in the allotted time, the FIRE and RETURN buttons are reactivated.
6. The missile can be shut down once it is airborne. Click CWI in the STIR STATUS area. This turns off the Continuous Wave Illumination (CWI) and signals the missile to shutdown.
  - If you wish to launch another SM-2 missile while the STIR is guiding the current missile, assign a target to the CAS. The process is that same as described above.

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**Tip:** The STIR can only guide SM-2 missiles while the CAS can guide both SM-2 missiles and the gun. By using the STIR to guide the SM-2, you leave the CAS available for gun engagements. You are prevented from assigning an SM-2 to the CAS unless the STIR is currently guiding a missile. The Harpoon has a built-in radar and does not use the CAS or STIR.

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### **To Launch A Harpoon Missile:**

1. Click the HARPOON PLAN navigational button and create a Harpoon Plan for the desired target. (See FFG STATION/Weapons Control Station/Harpoon Plan Panel for information on creating a Harpoon Plan.)
2. Click the MISSILE CONTROL button.
3. Select the desired Harpoon Plan number by clicking the down arrow in the Harpoon Plan area of the Missile Control Panel.
4. Click HARPOON in the RAIL STATUS area. The missile can be returned to stores only until it begins warming.

5. Click RETURN to return it to stores. Once it begins warming it must be launched or jettisoned.
6. When the Harpoon is READY, click FIRE.
7. Click CONFIRM within five seconds to proceed with the launch of the weapon.
8. To jettison the missile click JETTISON.
9. Click CONFIRM within five seconds to jettison the weapon.

✓ **Note:** The Harpoon has a standoff range of 5 nautical miles. It cannot be fired against targets closer than five nautical miles to Ownship.

## GUN CONTROL PANEL

The Gun Control panel targets and fires the Mk 75 (76 mm) gun. When Ownship's course is such that the gun cannot physically engage the target, nothing happens when FIRE is ordered. The steps involved in firing the gun describe the areas and buttons found in the Gun Control VAB Panel.

✓ **Note:** As modeled in S.C.S. – *Dangerous Waters*, the gun has a range of 10 nm (approximately 20,250 yards.)

### Engaging a Target With the Mk 75 Gun

1. From the Weapons Control Station click GUN CONTROL to access the Gun Control VAB panel. The gun can only engage targets to port and starboard and cannot fire on targets within two no-fire zones fore and aft of Ownship. The no-fire zones appear on the Geoplot as two cones filled with wavy lines.
2. Select a track number in the Target Queue or select a contact on the Geoplot that is not in the no-fire zone.
3. Click ASSIGN in the CAS STATUS area to assign the target to the fire control radar. The VAB changes to DEASSIGN. (The STIR can only be used with the SM-2 missile.)

✓ **Note:** If the CAS is currently guiding a missile, this button changes to CWI (Continuous Wave Illumination.) Clicking CWI shuts down the radar and causes the missile to self-destruct. When CWI is clicked or when the missile reaches its target this VAB reverts to ASSIGN. If the CAS was previously assigned to a contact, you may need to DEASSIGN the previous contact to assign the desired contact.

4. Click HOLD FIRE to activate the SINGLE FIRE and RAPID FIRE VABs.  
⇒ Click SINGLE FIRE to fire a single shot.

- ⇒ Click RAPID FIRE to fire continuously. The gun continues to fire until RAPID FIRE is clicked again or HOLD FIRE is selected or you run out of munitions. The gun is reloaded automatically.

5. Follow the trajectory of the shot in the Camera view. Click the CAMERA slider at the left of the screen to display the Camera view. (If the selected contact does not appear in the camera, it is possible that the contact is not where you think it is or that the contact has been destroyed. Check the age of the contact in the Nav Map DDI. If it has been some time since the contact was last updated this can indicate that either the contact is out of sensor range, no tracker is assigned, or the contact has been destroyed and has sunk, thus it can't be updated.)
6. If the round misses the target, adjust the trajectory in the Manual Correction area.
7. Click DEASSIGN to turn off the fire control radar and un-assign the target from CAS when done firing.

**MANUAL CORRECTION:** If there is no wind and neither ship is moving, the gun hits the target without correction. Such conditions are rare. Given wind and ship movement, the trajectory may require manual adjustment.

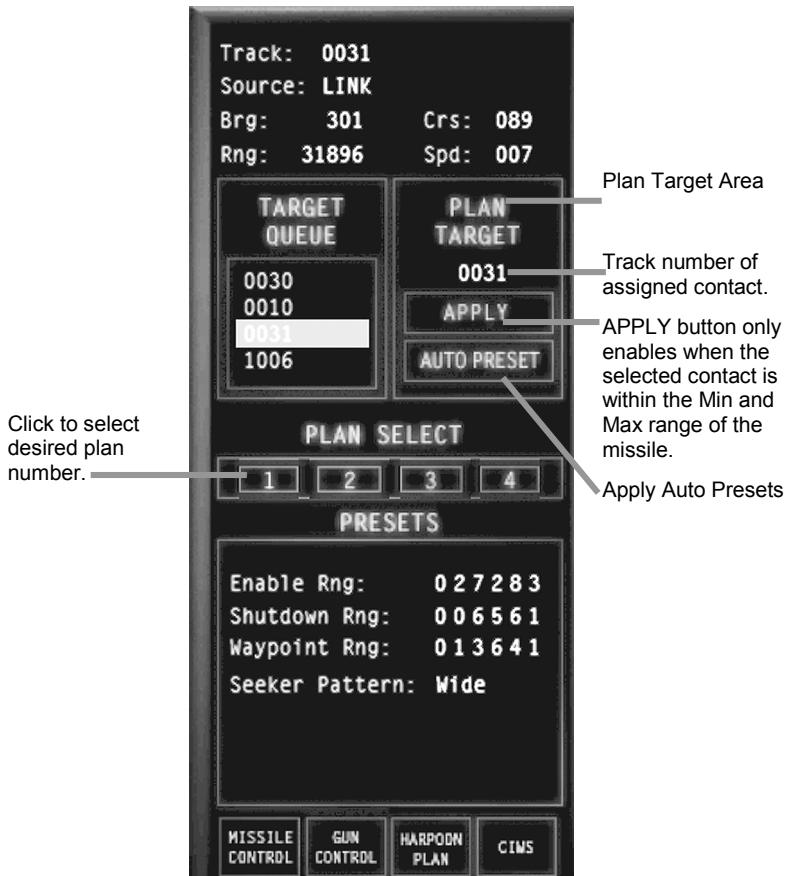
1. Follow the shell trajectory and resulting splash in the camera view to determine the need for adjustment.
2. In the Manual Correction area Click + or – as needed to adjust the bearing (Brg) and range (Rng) of the next shot. Correction is basically trial and error.

**CAMERA View:** The camera view follows the shell trajectory.

- ⇒ Click CAMERA slider at the left of the station to display the Camera. You cannot pan in the 3D camera view. Your view is of the gun's view. Press [Ctrl] + [+] and [-] to zoom the camera view.
- ⇒ Click the left and right facing arrows below the camera view to switch between the Gun Turret view and the Heli Forward Observer View. That view is only available when a Heli is aloft and SYNC has been established.
- ⇒ Click XCAMERA to retract the camera view.

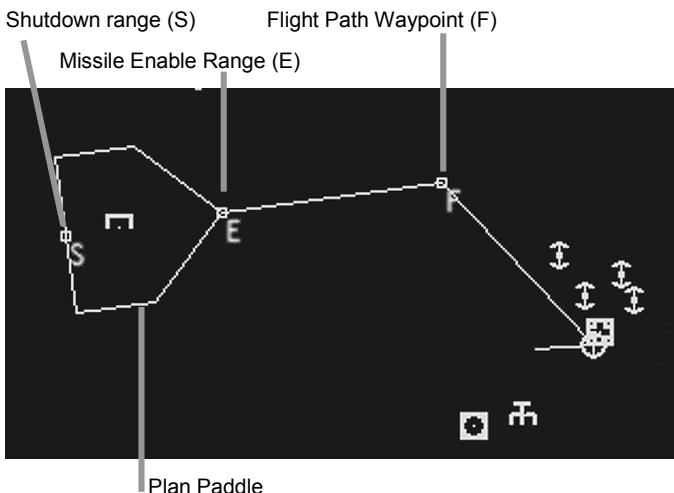
## **HARPOON PLAN PANEL**

The Harpoon Plan Panel is used to set the flight path and create enable and shutdown presets for Harpoon missiles. A plan is specific to a selected target. The plans created in the Harpoon Plan Panel are available for selection in the Missile Control Panel. The steps for creating a Harpoon Plan explain the VABs and areas of the Harpoon Plan Panel. Up to four Harpoon Plans can be created. The FFG carries a maximum of four Harpoons. The FFG's fire control radars are not needed for a Harpoon launch. The missile has its own weapon radar and follows the course specified in the plan.



### To Create a Harpoon Plan:

1. Click a number (1 – 4) in the PLAN SELECT area to create presets for that plan number.
  - A Plan “Paddle” appears on the Geoplot at the end of a missile flight path attached to the OS Symbol.



### ***Harpoon Plan Paddle***

- ❑ There is one waypoint in the flight path marked with a tiny F. The pointed end of the paddle, representing the missile's enable point is marked with a tiny E. The flat end of the paddle, representing the missile's shutdown range, is marked with a tiny S.
- ⇒ Click the square next to the F, E or S to select it then drag the square to adjust the paddle position or dimensions. (The Harpoon has a minimum enable range of 5 nautical miles in S.C.S. – *Dangerous Waters*. The range to the enable point cannot be placed closer than 5 nautical miles. The paddle will jump to an acceptable range if you attempt to move it closer than its minimum enable range.)

2. Click a track number in the TARGET QUEUE or click a contact on the Geoplot to select that track as the target for this plan. The APPLY button is enabled.

✓ **Note:** If the APPLY button does not enable, the range of the selected contact is either too close or too far from Ownship. See *Harpoon Minimum and Maximum Range* below.

3. Click APPLY in the PLAN TARGET area. The assigned track number appears below PLAN TARGET. This locks in the selected track as the target for this plan. If APPLY is not clicked any changes made to the presets are lost when a new plan or a different navigational button is selected.

4. Click AUTO PRESET to set a computed intercept course, enable range, shutdown range, default waypoint, and seeker pattern. The Plan Paddle moves to encompass the selected track.
5. While you can click or right-click on the numerals in the PRESETS area to adjust any of the settings it is easier to click the E, S or F squares in the Plan Paddle on the Geoplot to adjust the enable, shutdown or waypoint range. Moving the paddle automatically updates the numbers in the Preset Panel. Be aware that the presets numbers constantly update to reflect Ownship's movement and the projected course and speed of the target. The preset fields are described below.
6. To set a different target for this plan, select a different contact and press APPLY. Manually move the Plan Paddle or click AUTO PRESET again to move the paddle automatically to cover the new target.
7. Click MISSILE CONTROL. Select the plan number from the HARPOON PLAN area. See *FFG Stations/Weapons Control Station/Missile Control Panel/To Launch A Harpoon Missile*.

### **Harpoon Plan Presets**

**Enable Rng:** This field shows the range at which the missile's radar enables and begins searching. Minimum enable range is 5 nautical miles. The enable point is identifiable on the Geoplot as a tiny square with a tiny E at the pointed end of the Plan Paddle. Click the tiny square and drag to the desired location. If you attempt to move the enable range closer than its 5 nautical mile minimum, the paddle automatically repositions such that the minimum enable range is accounted for. Try moving the flight waypoint further away from Ownship.

**Shutdown Rng:** This field shows the range at which the missile shuts down automatically. This number indicates yards beyond the Enable Range. The shutdown range is identifiable on the Geoplot as a tiny square with a tiny S. Click the tiny square and drag to the desired location.

**Waypoint Rng:** This field shows the range of the flight path waypoint. The point is identifiable on the Geoplot as a tiny square with a tiny F. Click the tiny square and drag to the desired location.

**Seeker Pattern:** Defines the weapon's search pattern as Narrow or Wide. Click the text in the Seeker Pattern field to switch between options.

### **Harpoon Minimum and Max Range**

The selected target must be within the Harpoon's minimum enable range (5 nm) and maximum range (70 nm) from Ownship. If the selected contact is too close or too far from Ownship the APPLY button will not enable.

If your manipulation of the flight waypoint or shutdown range creates a total distance that exceeds the maximum range of the missile, the Plan Paddle and/or flight path resize to fit its min and max range window. During the resizing process the flight path jumps on the Geoplot.

## CIWS PANEL

The CIWS Panel is used to target and fire the 20-mm Mk 15 Phalanx gatling Close-In Weapons System (CIWS). The Phalanx targets incoming air contacts as assigned in manual mode or in one of two auto modes. The CIWS tracks targets with its own independent radar system.

- ✓ **Note:** When Show Truth is OFF, the contacts you see in the Geoplots represent solutions. Solutions are your best guess as to the location, course, and speed of the contact as provided by your OS sensors, the Link or your own TMA assessment. If the solution data for a contact is in error or is old, is possible that the contact you select to target on the Geoplot or in the Target Queue is not at the location seen in the solution or that the contact has been destroyed since it was first reported. In this case, the fire control radar will not acquire the selected target since it is not on the selected bearing. Solutions are not automatically removed from the Nav Map, Geoplot or TMA plot when they are destroyed. They proceed at the last reported course and speed.

### ***To Manually Engage Contacts with the CIWS:***

1. Click HOLD FIRE to activate the CIWS VABs.
2. Select a target in the TARGET QUEUE or click a contact on the Geoplot.
3. Click ACQUIRE and wait until the HOOKED bearing and the ACQUIRED bearing match (or nearly match) indicating that the CIWS is tracking the desired target.
  - ❑ Once you click ACQUIRE the radar remains locked on the acquired contact even if you click on a different contact. To acquire a different contact click ACQUIRE (or HOLD FIRE) again, to deselect the current contact, select the new contact and repeat the steps above.
4. When the numbers match (or are within a few degrees), click ENGAGE to begin firing.
  - ❑ The ENGAGE button is greyed if the selected contact is out of range of the CIWS Radar or in the no-fire zone.
  - ❑ **Contacts in the no-fire zone:** The CIWS is located at the back of the ship and cannot target contacts in front of the ship that are within a no-fire zone (15 degrees either side of Ownship's bow.) The no-fire zone is represented on the Geoplot as a cone containing wavy lines extending in front of the Ownship symbol. If

you have acquired and are engaging a target that moves into the no-fire zone, the gun ceases to fire. The radar continues to track the target and the gun will begin firing again if the contact is still within range when it emerges from the no-fire zone. Dashes appear in the ACQUIRED field when the contact is in the no-fire zone. The STATUS field continues to show ENGAGING during this entire evolution, even when the CIWS is not firing.

- ❑ **Contacts within range of CIWS Radar:** If the selected contact is outside of the no-fire zone and within range of the CIWS radar but not yet within range of the CIWS projectiles, clicking ENGAGE assigns the radar to track the selected target and the CIWS begins firing at the contact as soon as it is within range of the CIWS projectiles. In this case, the STATUS field lists IDLE rather than ENGAGING until the contact is under fire.

5. Click HOLD FIRE to stop firing.

### **Placing CIWS in Auto and Full Auto Mode.**

Click the green HOLD FIRE button to access the AUTO mode VABs.

- ⇒ Click AUTO to set CIWS to automatically engage air tracks for contacts that are incoming in excess of 200 knots.
- ⇒ Click FULL AUTO to set CIWS to automatically engage any air track within range of the CIWS Radar.

✓ **Note:** In FULL AUTO mode CIWS engages friendly as well as hostile aircraft and missiles in range.

- ❑ Remember that solution data does not go away by itself in the Nav Map or Geoplots. If the CIWS is in Auto or Full Auto and stops firing before running out of bullets, it is likely that the contact has been destroyed. The contact may also have exceeded the range of the CIWS.

### **Reloading the CIWS**

The CIWS reloads automatically when it runs out of bullets if there is a remaining magazine. If Weapon Quick Launch is OFF, the reload process takes 20 minutes. If Quick Launch is ON the CIWS reloads in 20 seconds.

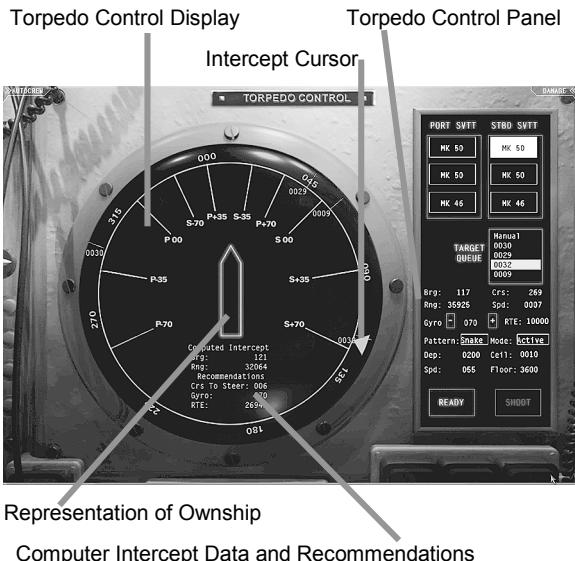
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## **FFG TORPEDO CONTROL STATION [F11]**

In the Torpedo Control Station torpedoes in specific tubes are selected, assigned to a target and presets are entered. The circular Torpedo Control Display at the left of the screen helps the operator visualize the best course to steer and gyro setting for an effective shot. The Torpedo Control Panel on the right side of the station provides the means to select targets, view the target solution and enter presets for the weapon.

✓ **Note:** Be aware that any contacts currently in the Target Queue and all assigned targets are cleared if Show Truth is toggled. These

contacts are not returned to the queue when the mode is returned to the original setting. You must re-enter the contacts. If a tube is assigned to a specific track when the Truth mode is toggled or the track is otherwise dropped either by the weapons coordinator or from the Nav Map or TMA Station, the weapon remains assigned to the bearing of the original track number.



## TORPEDO CONTROL DISPLAY

The Display consists of the following parts:

**Compass:** The outer circle is a compass that rotates to indicate Ownship course at the 12:00 position.

**Target Track Numbers/Lines:** Surface and subsurface tracks overlay the compass as single lines accompanied by a track number. If no tracks are listed in the TARGET QUEUE no tracks or lines appear on the Compass.

**Intercept Cursor:** The triangular cursor moves along the outer edge of the circle and jumps to the computer intercept bearing of the target selected in the TARGET QUEUE. The cursor turns a bright orange when Ownship's course approaches the course recommended in the Course To Steer readout and the gyro is set to the recommended setting. This indicates that optimal launch conditions exist.

**Ownship:** The hull shape at center of the display represents Ownship. The bow of the ship points to Ownship course on the compass.

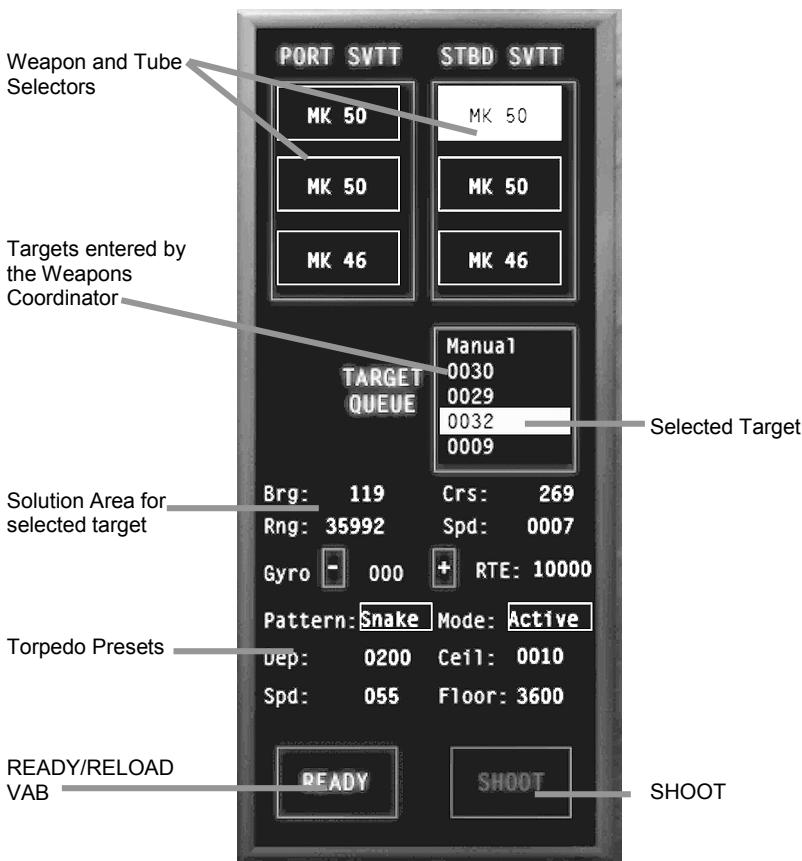
**Gyro Offsets:** Lines radiating inward from the outer circle represent gyro settings for the port and starboard launchers, and are labeled as either P or S (for Port or Starboard) followed by the gyro offset.

**Computed Intercept:** When a target is selected in the Target Queue, the Computed Intercept area contains a readout of the computed bearing and range to the intercept point. If in Manual mode this shows the bearing of the cursor in the outer compass.

**Recommendations:** When a target is selected, this area provides a readout of the computer recommended course to steer, gyro setting and Run to Enable (RTE). The Run to Enable and gyro settings are entered in the Torpedo Control Panel. It may be necessary to change to the recommended course to effectively engage the target.

## TORPEDO CONTROL PANEL

Torpedoes and tubes are selected, presets entered and the weapons are launched from the Torpedo Control Panel. The panel consists of these areas, buttons and settings:



**Port SVTT/ STRBD SVTT:** The Port SVTT and Starboard SVTT buttons list the weapon currently loaded in the tube. Presets are remembered individually for each tube.

- ❑ Selecting an empty tube begins the half hour reloading process; during this time the button flashes "Reload Time MM:SS" and the other tubes for that side go inactive. (When Weapon Quick Launch is selected in the Options/Game screen, reload time units are reduced from minutes to seconds.)
- ❑ Clicking the Reload button again with greater than 15 minutes remaining cancels the reload and re-activates the other tubes; under 15 minutes the process cannot be halted.
- ❑ The weapon to be loaded is not selectable; Mk-50 torpedoes are automatically chosen first until they are depleted.

Maximum torpedo range as modeled in S.C.S - *Dangerous Waters*:

**Mk-46 Torpedo:** 12,000 yd (10,973 m; 6 nm)

**Mk-50 Torpedo:** 14,177 yd (12,960 m; 7 nm)

**TARGET QUEUE:** Targets are added to the Target Queue at the Weapons Coordinator Station [F8]. No air contacts appear in the Torpedo Target Queue. When targets are in the queue, their track numbers appear in the compass area of the Torpedo Control Display next to a short line. By default Manual is selected in the list.

**Solution Area:** When Manual is selected, the range, course, and speed fields in the solution area are blank; only the current cursor bearing is shown. The bearing field in the Computed Intercept area reflects the cursor bearing.

When a track number is selected in the TARGET QUEUE the solution data for that target (bearing, range, course and speed) displays in the fields directly below the Target Queue. Depending on the source of the selected track, the solution may be determined by the source (Link, FFG Lookout) or entered by you or your TMA Autocrew at the TMA Station. The solution is only as good as the source. When the contact selected in the Target Queue has only a line of bearing, no solution data exists. Only the bearing appears in the solution area.

**Torpedo Preset Area:** Here you enter torpedo settings appropriate for the selected target and weapon. Check the Recommendations in the lower portion of the Torpedo Display for presets generated by the ships computer.

- ⇒ Click or right-click to increase or decrease a digit in the preset area.

**Gyro:** Click + or - to change the Gyro Offset to match that shown in the Recommendation area in the Torpedo Control Display. When the correct preset is entered the Intercept Cursor in the display turns a bright orange color.

**RTE (Run to Enable):** This number (in yards) sets the distance at which the torpedo enables and begins searching.

**Pattern:** Sets search pattern to Snake or Circle. Click button to toggle pattern selection.

**Mode:** Sets Active or Passive mode for the selected Torpedo. Click the button to toggle mode.

**Dep:** Sets the maximum depth for the torpedo run. (In feet)

**Ceil:** Sets the minimum depth (ceiling) for the torpedo run. (In feet)

**Spd:** Sets torpedo run speed in knots. Speed cannot be set higher than the maximum speed of the weapon.

**Floor:** Sets the depth below which the weapon will not go.

## FIRING A TORPEDO

Targets are selected for engagement and placed in the Target Queue at the Weapons Coordinator station. Surface and submarine targets added there are available for selection in the Torpedo Control Station.

### **Targets with Solutions**

The following steps assume a track number with a solution is selected in the Target Queue. All such targets have all four elements of a firing solution: Bearing, range, course and speed. Given this information, the system easily computes the intercept point for such targets.

1. Select a track number from the target cue. Solution data fills in all fields in the solution area. The triangular Intercept Cursor snaps to the projected intercept point on the Torpedo Control Display. The computer generated intercept bearing and range appear at the bottom of the display window along with the recommended presets in the Computed Intercept and Recommendations area of the Torpedo Display Window.
  - The Intercept cursor turns a bright orange when the ship's course and gyro presets are set to ensure a favorable launch position.
2. In the Presets Area of the Torpedo Control Panel, enter the gyro and RTE (Run To Enable) settings shown in the Recommendation area on the Display window.
3. If necessary, change course to that recommended in the Course to Steer field.
4. Set presets as appropriate. Click or right-click the digits to enter the desired settings.
5. Click READY. The button flashes until the SHOOT button is enabled. READY becomes CANCEL. The presets are locked on the current settings for the selected torpedo.
6. Click SHOOT to fire the torpedo.
  - ⇒ Click CANCEL to return to the presets mode to change a preset or select a different target for the torpedo.

### **Manual Mode and Tracks with LOBs**

To fire a torpedo on a specific bearing, follow these steps:

1. Click a tube to select it. In general, it is best to select a tube on the same side of Ownship as the contact—i.e., port tube for a port side contacts and starboard tube for a starboard side contact.
2. Select Manual in the Target Queue.
3. Click the Torpedo Control Display Compass at the desired intercept bearing. Only the Bearing field in the solution area contains data.
4. Set the desired settings in the preset area taking into account the recommendations at the bottom of the Torpedo Display. You may need to alter course to ensure a successful shot.
5. Click READY. The presets for the weapon in the selected tube are assigned and locked.
6. Click SHOOT or click CANCEL to free the weapon for a different assignment.

It is possible for the Weapons Coordinator to assign tracks to the Target Queue that consist only of a line of bearing, contacts for which no solution has been entered in TMA. Such tracks are selectable in the Torpedo Control Target Queue. The above steps apply for a track consisting only of a line of bearing.

✓ **Note:** When Torpedo Control Autocrew is ON, the only presets you can alter in Manual Mode are Bearing and Gyro. No presets can be altered when a numbered target is selected from the Target Queue.

### ***Loading an Empty Tube:***

Loading an empty tube takes thirty minutes. All tubes in the bank are disabled while a tube is reloaded.

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**Tip:** Turning on Weapon Quick Launch in the Options/Game screen shortens the reload time from thirty minutes to thirty seconds.

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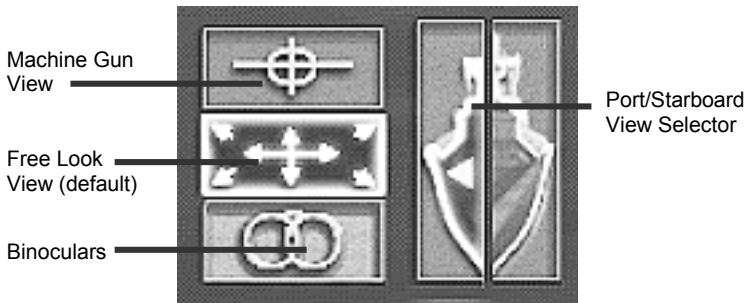
1. Click an empty tube to select it. The RELOAD button replaces the READY button. (The weapon to be loaded is not selectable; Mk-50 torpedoes are automatically chosen first until they are depleted.)
2. Click RELOAD to begin the reload process. The time remaining counts down in the empty tube location. And other tubes in the tube bank on that side of the ship are unavailable.
  - ⇒ Clicking the RELOAD button with greater than 15 minutes remaining cancels the reload and re-activates the other tubes.
  - ⇒ When time remaining is under 15 minutes the process cannot be halted.

---

## **FFG MACHINE GUN STATION [F12]**

The two 50-caliber machine gun stations are located in the aft part of the ship above the Heli Deck. The guns are used to defend Ownship against hostile small boats and small aircraft. The default view is Free Look.

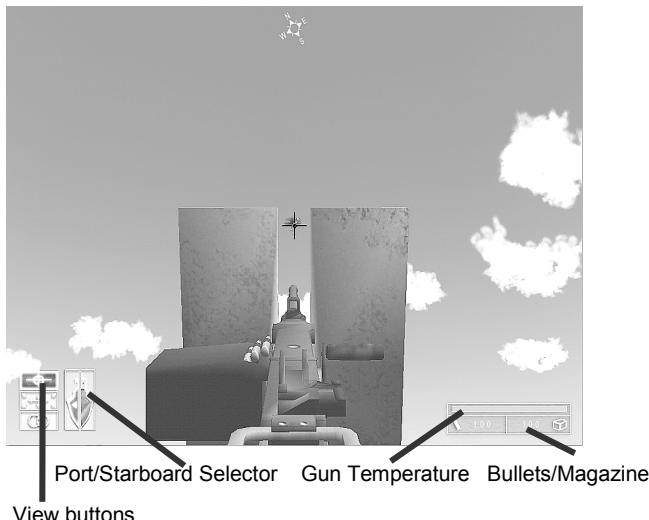
From this location it is possible to see the aft portion of the ship not visible from the bridge wings. Machine Gun and Binocular Views are also available on both the port and starboard sides of the ship via the appropriate view buttons.



- ⇒ The highlighted state indicates the current view. Click a dark state to select that view.

## MACHINE GUN VIEW

The starboard machine gun is seen by default when the Machine Gun view is selected. Click the dark side of the ship profile next to the view control buttons in lower left of the screen to switch to the other side of the ship. The compass above the gun depicts the true bearing at the gun sight.



### Firing the Machine Gun

1. Click and drag in the view to pan and position the gunsight at the desired bearing and elevation.

2. Position the gunsight on the target. When the target is in the center of the gun sight the reticule becomes a black circle.
3. Right-click to fire the gun.

- The gun overheats if fired continually. Watch the temperature gage. When the gun overheats there is a short cool down period before the gun can be fired again.
- The gun automatically loads a new magazine when 100 shots have been fired.
- The maximum range for this gun as modeled in S.C.S. – *Dangerous Waters* is 2 nm (4050 yards).

## **FREE LOOK VIEW**

Free Look, the default view, permits an unobstructed look at the 3D view to the horizon on both the port and starboard sides of the ship. The area aft of the ship is also visible.

- ⇒ Click the Free Look view button to access Free Look view.
- ⇒ Click and drag in the 3D view to adjust the view.

## **BINOCULARS**

The binoculars work nearly the same here as in the Bridge Wings; however, from this station it is possible to switch directly to the view on the opposite side of the ship.

- ⇒ Click the Binocular Icon to access binocular view.
- ⇒ Click the arrows at the upper left and right of the screen to switch between the port and starboard views.
- ⇒ Click and drag in the binocular view to pan and adjust the vertical view.
- ⇒ Click the + and – buttons next to the Zoom display to change zoom level.
- ⇒ Click LLTV or VISUAL to switch between modes. The default is Visual. Low-light Level TV (LLTV) is available for night scenarios.

---

## **FFG AUTOCREW**

Below is a recap of all FFG Autocrew functionality. Remember that your Autocrew is not 100% infallible. Some crewmen are better than others and in some cases you may be better at a task than he is. In some stations the Autocrew does everything for you. At other stations you still have tasks to perform even when the Autocrew is on. These are noted below.

## **FFG COUNTERMEASURES AUTOCREW**

When ON the Countermeasure (CM) Autocrew launches Chaff and flares. The FFG's Countermeasure Autocrew is set via the Autocrew slider in the upper left corner of the Bridge Station.

**Your Task:** You can still launch CMs yourself and reload the tubes even when the Bridge Countermeasure Autocrew is on.

## FFG ACOUSTIC AUTOCREW

When the Receiver Mode is set to SHIP and buoys are in the water, the FFG's Acoustic Autocrew sets hot buoys to Directional mode and marks contacts. He can only mark contacts in Directional Mode. He cannot change the Receiver Mode. On the FFG, buoys can be set to Directional mode only in Display Windows (Grams) A - D.

**Your Task:** You must place buoys in the water so the Autocrew has something to process. Since the Acoustic stations defaults to AIR/SHIP Receiver Mode and the AIR mode occupies Grams A – D, the Autocrew cannot mark anything until you first set the Receiver Mode to SHIP. (Contacts can only be marked in Directional and Active mode.) Omni mode is used only for detecting and classifying contacts. (You must set DICASS buoys to Active mode yourself. See *Training/Sonar School/Sonobuoys* and *FFG Stations/Acoustic Station* for information on the display window requirements for setting buoys to Directional and Active modes.)

## FFG EW AUTOCREW

The EW Autocrew marks contacts but does not classify. You are prevented from doing anything in the EW station when the EW Autocrew is on.

**Your Task:** You must turn EW Autocrew off to perform any tasks in the EW station. It is your task to classify contacts by identifying the probable contact from the list of classes known to carry the detected emitter. See *FFG Stations/FFG EW Station* for information on classifying contacts in EW.

## FFG LOOKOUT

The FFG Lookout is always ON. You cannot turn OFF this feature. The lookout reports all visual contacts providing the relative bearing to the contact and an estimated range. If the contact is close enough he may also provide a fairly accurate classification. In S.C.S. – *Dangerous Waters* FFG lookout reports are sent to the TMA Station to facilitate merging with passive contacts. This helps clean up the 3D View on the Nav Map.

## FFG TMA AUTOCREW

When ON the TMA Autocrew selects contacts for analysis, merges contacts, determines probable course, range and speed and enters a solution for the contact.

**Your Task:** You are prevented from making any inputs when the TMA Autocrew is ON. You can select the contact to view. You see updates appear only for the selected contact. If a contact is merged you see updates from both reporting sensors when the merged contact is selected.

## FFG TORPEDO CONTROL AUTOCREW

When ON the Torpedo Control Autocrew enters presets appropriate for the selected contact.

**Your Task:** Select the target to attack and the tube to be fired. For Manual shots you must set both the bearing and the gyro setting. All other presets are set by the Autocrew and cannot be changed. You may need to alter Ownship's course to ensure a successful shot. You must also ready the tube, locking in the presets for the selected weapon, and fire it.

## FFG TOWED ARRAY AUTOCREW

Towed Array Autocrew marks contacts, assigns ATF Trackers and resolves bearings in broadband; he also cycles through LOFAR data and classifies contacts in Single Beam. The FFG Towed array always detects Ownship because the array is dragged so far behind the ship. In order to conserve trackers and minimize unnecessary clutter Autocrew does not assign a tracker to the OS detection.

He will not mark or assign an ATF to the towed array's detection of Ownship. When Towed Array Autocrew is ON, you can select a beam in LOFAR for him to examine in Single Beam mode but he may not classify it. He rotates through all contacts on his own schedule.

**Your Task:** When the Towed Array Autocrew is ON you need do nothing more at the Towed Array Station. However, since your Autocrew is not the speediest, you can mark contacts and assign ATF's yourself. At a later time the Autocrew may reassign your ATFs to another contact if the array is detecting many contacts. Be aware that the Autocrew is not the best or the quickest at classification. The Profile Filter is always ON and disabled when Autocrew is ON. You can select any class in an available profile list and apply it yourself.

*SECTION 8*

# *MH-60R STATIONS*



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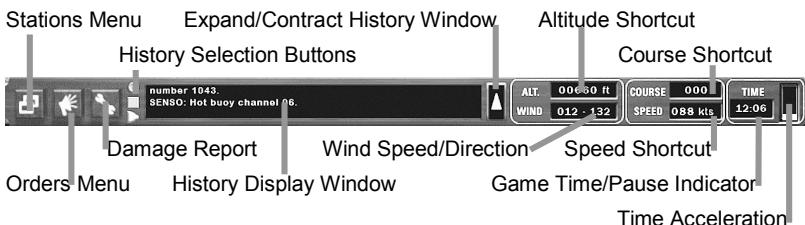
## 8: MH-60R STATIONS

In S.C.S. - *Dangerous Waters* the MH-60R multi-mission helicopter can be deployed on ASW, ASUW and Strike missions. The MH-60R stations as modeled are described in this section.

- ✓ **Note:** The default view when entering a mission is the Navigation Station. The Navigation Station functions the same on every controllable platform and is covered only once in the manual. See *Navigation Station*. Some Nav Station information unique to the MH-60R is contained in *MH-60R Navigation Station* later in this section.

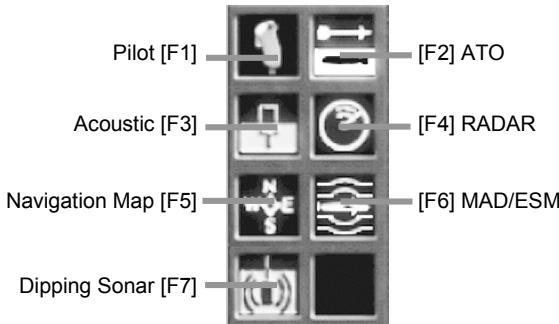
### MH-60R TASK BAR

The MH-60R's Task Bar is similar to all task bars but also has wind and altitude readouts and shortcuts described below.



### STATIONS MENU

Click the Stations Menu button to expand the selection menu. Select an icon to jump to that station. Selected station icons are white.



### ORDERS MENU

The Orders Menu provides a means for quickly issuing a variety of commands. The commands available for the MH-60R are explained below.

**Navigate:** The following submenus are available:

**Return to Base:** When your Ownship is the in-flight helicopter for a FFG in the mission, select this option to order your Heli to land on your base platform to reload weapons or to satisfy a goal. (This option does not appear if the mission designer created the helicopter you are piloting as a standalone aircraft. A standalone aircraft has no base.) When this option is selected the Auto Pilot steers the helicopter back to the parent ship and lands it. The helicopter maneuvers to approximately a mile behind the launching platform then turns to make its approach. If you order a change in course, you must reselect *Return to Base* to order OS to land. Once OS lands on deck, the MH-60R Weapon Loadout Screen appears allowing you to reload or change the weapons currently loaded.

- Be warned that once you close the Weapon Loadout window you cannot open it again. You must wait until you take off and land again.
- ⇒ **To take off again after landing:** Enter an altitude that is approximately 100 feet higher than the surface on which you have landed. Then order a forward speed and a course. (There is a delay of 3 minutes before you can take off again after landing. If Aircraft Quick Launch is ON, this delay is reduced to 20 seconds. A timer appears on the Nav Map displaying the amount of time remaining until launch is possible.)

**Speed:** Displays a submenu of options that allow you to quickly set OS speed to:

High: 127 knots, Medium: 67 knots, Low: 37 knots or Hover: 0 knots. (Wind conditions affect the indicated air speed seen in the Speed shortcut in the Task Bar.)

**Altitude:** Displays a submenu of options that allow you to quickly set OS altitude to High: 8499 feet, Medium: 3,999 ft, Low: 498 ft or Dip: 50 ft, the best altitude for using the dipping sonar.

**Autocrew:** Displays a submenu of Autocrew options available in the MH-60R. A checkmark indicates the Autocrew is ON. Autocrew can also be turned ON/OFF using the Autocrew slider button in the upper left of every station that has Autocrew functionality. Complete information on MH-60R Autocrew is found at the end of this chapter.

**Auto-Countermeasures:** When ON, Auto-Countermeasures Autocrew launches Chaff and Flares when a missile is locked on Ownship and takes evasive maneuvers.

**ATO:** When ON, ATO Autocrew enters presets for torpedoes.

**Acoustic/Sonobuoys:** When ON, Acoustic (Sonobuoy) Autocrew sets buoys to Directional mode and marks contacts. When he is ON, you are prevented from changing channel numbers. (He will change them right back.)

**Radar:** When ON, Radar Autocrew marks radar contacts as long as the radar is operational. You are prevented from moving the cursor.

**ESM:** When ON, ESM Autocrew marks contacts in the ESM Scope. He does not classify them. You must do that. You are prevented from moving the cursor or marking a contact while Autocrew is ON. (While MAD shared the ESM station, MAD contacts are marked automatically and are not tied to the ESM Autocrew.)

**Dipping Sonar:** When ON, Dipping Sonar Autocrew marks contacts in Passive Sonar. He does not classify contacts. Autocrew has no role in Active Dipping Sonar.

**Launch Pylon:** This option appears only when a weapon is assigned to a specific target or bearing at the ATO Station either via the ASSIGN button or weapon waypoint. Select the desired Pylon option to launch the weapon immediately. When a Hellfire is assigned the *Launch Pylon>Hellfire* option is greyed out until the target is within the Hellfire's acquisition cone.

**Countermeasures:** Displays a menu of available countermeasures. Select an option to launch a countermeasure of that type. The countermeasure count in the Countermeasure Launch panel in the Pilot station is decreased until all countermeasures have been launched.

**Sonobuoy:** Displays a menu of the remaining sonobuoy stores. Select a buoy option to drop that sonobuoy immediately. Shallow = 90 feet; Deep = 400 ft.

**Data Link:** Displays a submenu of Link related Options. The Link provides a secure method for sharing data with friendly platforms in the area. Information on contacts detected by OS and friendly platforms is shared with all other Link participants.

**Nav Control:** (SHIP/HELO): This feature is only functional in a Multiplayer game when OS is a deployed Heli from a FFG that is commanded by a different player. The FFG (SHIP) can request navigation control of your Heli from you, then enter waypoints for you to follow. Select SHIP to transfer navigational control to the FFG. Select HELO to take back waypoint control. See *MH-60R Stations/ATO Station* or *Multiplayer/Gameplay Differences in Multiplayer/MH-60R Multiplayer Gameplay Differences* for more information.

**Link Data:** (ACOUSTIC/RADAR): This feature is only functional in a Multiplayer game when OS is a deployed Heli from a FFG that is commanded by a different player. When the FFG requests RADAR or ACOUSTIC data from your sensors, his selection switches this option automatically. Make sure that your Radar is ON when the FFG requests Radar data. You need not be tuned to any buoys for you to pass buoy acoustic data to the FFG.

**SENO:** Displays a submenu of Sensor Operator (SENO) Stations.

**Hydrophone:** Displays a submenu of commands that control the deployment of the dipping sonar hydrophone.

Stream/Retrieve/Stop

**MAD Sensor:** Displays a submenu of commands that control the deployment of the MAD sensor.

Stream/Retrieve/Stop

**Radar:** Turns the radar ON. A checkmark indicates the radar is radiating.

**MAD:** Turns the MAD sensor ON. This option is only available when the MAD sensor is deployed. (This cable is deployed from the ATO screen or from the MAD sensor option in the Orders or Ownship menus. A check mark indicates the sensor is ON.)

**ESM:** Turns the ESM sensor ON. A check mark indicates the sensor is ON.

## DAMAGE REPORT WINDOW

The Damage Report Window lists damage that occurs at any station. Some damage is repaired over time. When damage is repaired a message appears here. An audible voice message may also be heard. Each entry lists the time in the mission when the damage occurred, the type of damage and an estimate of time until the damage is repaired or an indication that the damage cannot be repaired. If damage is severe it cannot be repaired during the course of a mission.

⇒ Click the wrench button in the Task Bar to open/close the window.

## HISTORY WINDOW

The History Window displays the type of history selected by the History Selection buttons to the left of the window. The window scrolls as necessary. The oldest history appears at the top of the window.

**History Selection Buttons:** A lit button indicates the currently selected History type. If there is a new message in any other window, that window's selection button flashes until that button is selected.



- Crew Report History: Lists all orders as acknowledged by crewmembers.
- Radio Traffic History: Lists all radio messages received.
- Multiplayer Chat History: Displays a history of multiplayer chat messages.

## MANEUVER SHORTCUTS AND GAME READOUTS

Digits and buttons are green by default. Selected buttons are white and maneuver shortcut digits change to white while changes are entered.

⇒ To change course, speed or altitude with a Maneuver Shortcut, click digits to reflect the desired number. Left click to increment a digit, right-click to decrement it.

**ALT:** Shows current altitude. Click digits to change altitude.

**WIND:** Displays the current wind speed in knots and direction in this format: Wind Speed – Direction.

**SPEED:** Displays relative speed through the air in knots. Click digits to order a change in Ownship speed. The speed you *order* is speed over the ground. If your ordered speed is 20 knots and you are flying into a 20-knot headwind, this readout displays 040 knots. If you are flying with a 20 knot tailwind, it will read 000.

**COURSE:** Shows current course in degrees. Click digits to change course.

**TIME:** Displays the time of day in the mission based on a 24-hour clock. When the game is paused, the time display is replaced by the word PAUSED.

- ⇒ Press [P] to pause the game. Press [P] again to resume the game.
- ⇒ Click the numbers in the Time display to pause the game. Click PAUSED in the time display to restart the game.

## TIME COMPRESSION SCALE

In addition to real time, S.C.S. - *Dangerous Waters* supports four levels of time compression. The time scale displays in the far right of the Task Bar. A stack of colored bars represents the level of time compression.

- At real time, a single green bar is displayed.
- At twice real time a lime (yellow/green) bar appears above the green bar.
- At four times real time a yellow bar is added to the stack.
- At eight times real time an orange bar is added.
- At up to sixteen times real time (depending on system capability) a red bar appears at the top of the stack.

⇒ Press [.] (period) or [.] (comma) or click/right-click on the scale to toggle through all the time scales

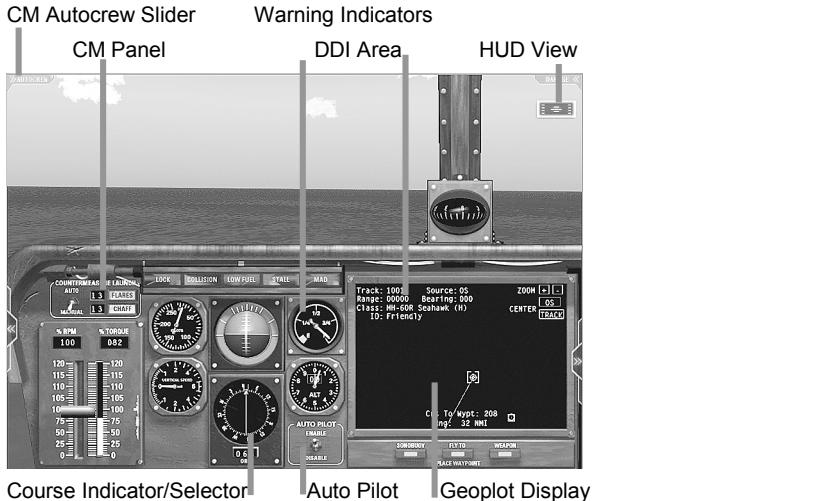
✓ **NOTE:** Time compression is not available in Multiplayer missions.

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## MH-60R: PILOT STATION [F1]

From the MH-60R Pilot Station countermeasures are launched and warning lights and fuel gauges are monitored. Course can be changed in the station interface but speed and altitude are changed as described below. The location of Ownship in relation to other contacts is monitored in the Geoplot Display. If so desired, the MH-60R can be piloted with a joystick when you are at the Pilot Station. See *Piloting the MH-60R with a Joystick* later in this section.

The Pilot Station is made up of the following components.



**To Change Course:** Click on the desired heading in the Course Indicator/Selector or enter the desired course in the COURSE shortcut field in the Task Bar. (Click/right-click to increment or decrement a digit.) In the Navigation Station, press [C] then click the Nav Map to change course to that direction.

**To Change Speed:** Enter the desired speed in the SPEED shortcut field in the TASK bar. Click or right-click to increment or decrement a digit.

Engine RPMs affect speed but speed is not changed with the throttle in the MH-60R. See Throttle below.

**To Change the Altitude:** Enter the desired altitude in the ALT shortcut field in the Task Bar. (Click/right-click to adjust a digit) or select a *Navigate>Altitude* command from the Orders Menu. From the Nav Map you can also use the Ownship Menu's *Navigate >Altitude* commands.

✓ **Note:** Program a joystick to perform all of the above functions. See *MH-60R Stations/Pilot Station/Piloting the MH-60R with a Joystick* later in this section.

## MH-60R PILOT STATION FUNCTIONALITY

The buttons, switches, gauges, and other functionality of the MH-60R Pilot Station starting at the left of the screen are described below:

**Countermeasure Autocrew:** The Pilot Station Countermeasure Autocrew controls several matters involving Ownship safety. The Autocrew icon in the upper left corner of the Pilot Station is linked to the AUTO/MANUAL switch in the Countermeasure Launch panel. Autocrew is turned on by either method.

⇒ Click the Autocrew slider to toggle the state of the Pilot Station Countermeasure Autocrew. When Autocrew is ON, the Autocrew

icon in the upper left displays the crewman silhouette and the Countermeasure Launch panel switch is set to AUTO.

- ✓ **Note:** Autocrew and Auto Pilot perform different functions. Auto Pilot is described later in this section.

The Autocrew works to ensure Ownship safety by:

- ❑ Automatically launching chaff and flares when a missile is locked on Ownship. Chaff and flares can still be launched manually when Autocrew is ON.
- ❑ Taking evasive maneuvers when Ownship is under attack.

- ✓ **Note:** When Autocrew takes evasive maneuvers he ignores course, speed and altitude changes attempted by the player until the evasive maneuver is complete.

**Countermeasure Launch Panel:** The following functions are possible in this area.

**CHAFF and FLARES Buttons:** A lit button indicates a countermeasure of that type is ready to launch.

- ⇒ Click the desired button to launch the indicated countermeasure. The button is dark until the tube is reloaded. Countermeasures can also be launched from the Task Bar Orders Menu or from the Nav Map using the Ownship Menu.

**Auto/Manual Switch:** When in AUTO mode, countermeasures are automatically launched when a weapon lock-on is detected. Countermeasures can still be launched manually when in Auto-mode.

- ⇒ Click on AUTO to place countermeasures in auto-mode. This turns the Pilot Station Autocrew slider to the ON position. Setting Countermeasure Launch to MANUAL turns off Autocrew as well.
- ❑ When Autocrew is ON, the Countermeasure Launch control switch is automatically set to AUTO. The Autocrew makes evasive maneuvers and automatically launches countermeasures when a missile is locked on OS.

**Throttle:** Controls engine revolutions per minute (RPMs). The throttle position impacts maximum speed achievable, the climb rate, and fuel consumption. Speed is changed in the Task Bar SPEED field or with a joystick.

- ⇒ Click and drag the throttle up or down to increase or reduce RPMs. If RPMs are too low you will not be able to maintain altitude.

**Warning Lights:** The following warning lights illuminate as indicated below.

**Lock:** Lit when a missile is locked on Ownship.

**Collision:** Lit when a collision with the ground or water is imminent. Take evasive measures.

**Low Fuel:** Lit when 10% fuel remains.

**ROTOR:** Lit when retreating blade stall is imminent. This light will normally appear only when driving with the joystick at a very high speed. Do what you can to slow down.

**MAD:** Lit when the Magnetic Anomaly Detector (MAD) senses a contact.

**Speed Indicator:** The needle indicates the current speed in knots. Change speed in the Task Bar with the Speed shortcut or use Orders Menu commands. Speed can also be changed with a joystick.

**Vertical Speed Indicator:** Indicates the current rate of rise in knots. Use full throttle to climb faster, less throttle to climb more slowly.

**Course Indicator/Selector:** The 12:00 position indicates the current course. The red arrow indicates the ordered course. A digital readout of the actual course appears below the Course Indicator/Selector.

- ⇒ Click on the desired heading to set Ownship on that course.

**Fuel Gauge:** Indicates current level of fuel.

**Horizon Indicator:** Provides the pilot with a visual indication of the aircraft's orientation relative to the horizon.

**Altimeter:** The Altimeter provides a visual representation of current and changing altitude. The digital readout indicates the attitude in thousands of feet. The longer hand indicates hundreds of feet (one sweep of the dial represents a thousand feet.) The shorter hand indicates thousands of feet (one sweep of the dial represents 10,000 feet.) The digits count off one unit per thousand feet of vertical elevation. Clockwise movement indicates upward movement. Counterclockwise movement indicates downward movement.

**AUTO PILOT:** The MH-60R Auto Pilot keeps the helicopter aloft and on course. He follows the last ordered course, speed and altitude and follows waypoints as described below.

- ⇒ Click ENABLE to turn on the Auto Pilot. Auto Pilot is on by default at game start and whenever a different station is selected.
- ⇒ When using a joystick, click DISABLE to move the switch to that position then move the joystick to take control of the aircraft. If no joystick is in use, switching the setting to DISABLE has no effect.
- ☐ When ENABLED the Auto Pilot follows the last ordered speed, altitude, and course
- ☐ Auto Pilot follows assigned waypoints unless a change of course is entered using the Course Indicator/Selector in the Pilot Station, the Task Bar's Course shortcut, *Navigate>Return to Base* from either the Orders or Ownship Menu or the Ownship Menu's *Navigate>Change Course* option. Once a course change has been issued, Auto Pilot does not follow waypoints until *Navigate>Follow Waypoints* is selected from the Orders or Ownship Menu.
- ☐ If Auto Pilot is DISABLED when you deviate from assigned waypoints and has turned on automatically by switching to a different station, Auto

Pilot does not follow waypoints until *Follow Waypoints* is selected from the Orders Menu's *Navigate* option.

- If Auto Pilot is DISABLED and the Aircraft is in a dive when Auto Pilot is again ENABLED, he attempts to level the aircraft and maintain that altitude and follow the last ordered speed and course. This is not always possible if the dive is too steep.
- Auto Pilot is ENABLED when a different station is selected. Move the joystick upon re-entering the Pilot Station to DISABLE the Auto Pilot.
- If Auto Pilot is ENABLED and the helicopter is over land and hovering, ordering an altitude of zero (0) causes the helicopter to touch down.
- If Auto Pilot is ENABLED and the helicopter is over land but *not* hovering, ordering an altitude of zero (0) causes the helicopter to level off at a safe altitude.
- If Auto Pilot is ENABLED and the helicopter is over water, ordering an altitude of zero (0) causes the helicopter to level off at a safe altitude regardless of speed.
- If a joystick is not installed, setting the Auto Pilot to DISABLE has no effect. If a joystick is in use, you must set the switch to DISABLE every time you enter the Pilot Station; however, the Auto Pilot does not truly disengage until you subsequently move the joystick.
- If using a joystick it is possible to land the Helo if over land or at a designated ship airstrip. It is also possible to drive the helicopter into the ground or the water when using a joystick.

**Heads Up Display (HUD) Access button:** When piloting the MH-60R with a joystick you may prefer the HUD view or Tail view when at the Pilot Station. Repeated clicks cycle through HUD, tail and Cockpit view.

**DDI:** This Digital Data Indicator (DDI) occupies the upper portion of the Geoplot and contains the following information about the track hooked on the Geoplot:

**Track:** Track number of selected track.

**Source:** Displays the source of the selected track (Visual, Link, Truth etc.).

**Range:** Displays the range to the selected track.

**Bearing:** True bearing to selected track.

**Class:** Link or player designated platform type of the selected track (Surf, Air, Sub etc.). When Truth is ON actual Class names appear here. Class name of Ownship and the Launching platform always appear here when selected.

**ID:** Link or player designated ID (alliance) of the selected track.

**Geoplot Display Controls:** The following buttons control the view on the Geoplot Display. The mouse wheel can also be used to control zoom levels.

**ZOOM:** Click desired button to zoom in (+) or out (-) on the Geoplot Display.

**CENTER:** Click OS to center Ownship symbol in the Geoplot Display.  
Click TRACK to center on the selected track.

**Geoplot Display:** The rectangular Geoplot Display shows symbols for contacts detected by Ownship or Link participants. The upper portion of the Geoplot Display contains the DDI.

- ⇒ Click and drag in the display to pan in any direction.
- ⇒ Use the mouse wheel to zoom in and out or use the Zoom buttons described above.

**PLACE WAYPOINT:** Waypoints can only be placed and manipulated by the ATO who shares the cockpit space with the Pilot. This is most apparent in a Multi-Station game when the waypoint buttons are disabled completely for the MH-60R Pilot. In Single Player games the buttons are clickable and serve to move you to the appropriate display in the ATO Station.

From the Pilot Station in a Single Player game:

- ⇒ Click FLYTO to automatically switch to the ATO Station and place a flight waypoint on the Geoplot. The waypoint cannot be manipulated in the Pilot Station Geoplot.
- ⇒ Click SONOBUOY to automatically switch to the ATO Station and place a buoy drop waypoint. The Sonobuoy Launch Panel is active and a buoy of the currently selected type is placed. If a buoy of that type is not desired, select the waypoint and press [Delete]. Select the desired type of buoy for the waypoint and click SONOBUOY again.
- ⇒ Click WEAPON to automatically switch to the ATO Station and open the ASSIGN TO WAYPOINT window. If no torpedoes are available, the assignment window does not appear.
- ❑ Waypoints can only be manipulated in the ATO Geoplot or the Nav Map.
- ❑ Flight waypoints are followed only when Auto Pilot is ENABLED. If a course change is entered, the Auto Pilot follows the last ordered course and no longer follows the waypoints. To resume following waypoints, select the Orders Menu's *Navigate> Follow Waypoints* option.

## PILOTING THE MH-60R WITH A JOYSTICK

The MH-60R can be piloted with a joystick whenever the Pilot Station is selected. The joystick must be programmed to work with S.C.S. - *Dangerous Waters* prior to gameplay as described below.

### Programming a Joystick

1. Ensure that the joystick is attached to the computer and any associated software is installed. Follow the joystick manufacturer's instructions for installation of any software and for connecting the joystick to the computer.
2. From the Main Menu select OPTIONS.
3. Click CONTROLS.

4. Click AIR/HELO to select it. A check mark indicates the option is selected.
5. Double click a line option in the list then move the joystick control as desired to associate that movement with the selected option. Items with no keyboard commands are commands that apply to a joystick only. No keyboard equivalents exist.
6. Continue until all listed options have been associated with a movement.

### **Using a Joystick**

Keep in mind the following points when flying the Helo using a joystick:

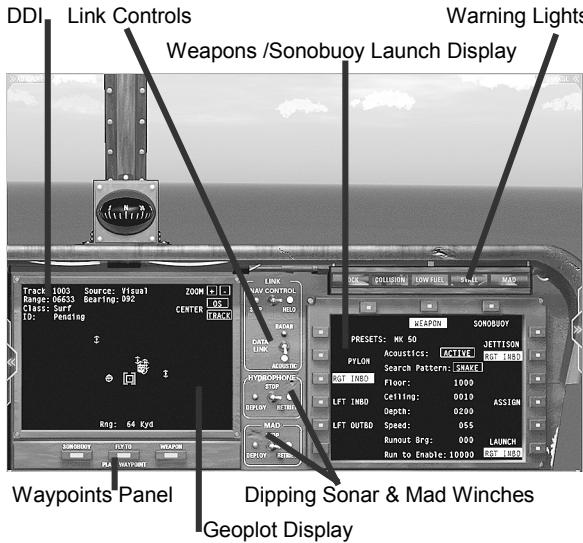
- The joystick must first be programmed as described above to work with S.C.S. - *Dangerous Waters*.
- The joystick is functional only in the Pilot Station.
- Set the Auto Pilot switch to DISABLE. Be aware that the Auto Pilot remains on even when set to DISABLE until you first move the joystick. The Auto Pilot is ENABLED automatically when a different station is selected and it maintains the last ordered course, speed and altitude. When returning to the Pilot Station from any other station, the Auto Pilot must again be DISABLED. You then take control of the aircraft by moving the joystick.
- Three views are available: Cockpit View, HUD View and Chase View. Click [V] to change the view.

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## **MH-60R: ATO STATION [F2]**

The Airborne Tactical Officer (ATO) shares the cockpit with the MH-60R Pilot. The ATO is responsible for targeting contacts and launching weapons and sonobuoys, deploying the dipping sonar and MAD sensors and for controlling Link data flow.

The ATO station is made up of the following areas:



**Autocrew:** When ON the ATO Autocrew sets Penguin missile and torpedo presets. You must select the weapon to be launched and assign a target or runout bearing but you cannot enter other presets if ATO Autocrew is ON. Autocrew makes no entries for Hellfire missiles.

**DDI:** The ATO and Pilot Station share the same Geoplot Display. The Digital Display Indicator (DDI) occupies the upper portion of the Geoplot. The DDI provides information on the track selected in the Geoplot Display.

**Geoplot Display:** The Geoplot Display shows NTDS symbols for all detected tracks as well as Link participants and Link detected contacts. Clicking on a track "hooks" or selects it. Known data about the selected contact appears in the DDI in the upper portion of the display. Use the mouse wheel to zoom in and out or use the Zoom controls in the DDI.

**PLACE WAYPOINTS:** The Waypoint Panel provides the means for adding fly-to points and weapon and sonobuoy drop waypoints.

- ⇒ Click the FLY TO button to place a flight waypoint. Assigning a sonobuoy or weapon waypoint requires a few more steps. See **To Place a Sonobuoy Drop Waypoint** and **To Place A Weapon Drop Waypoint** below.
- ❑ A tiny letter appears next to the waypoint on the Geoplot to indicate the type of waypoint that has been placed. Sonobuoy=B; FLY TO=F; Weapon=T (Weapon waypoints can only be assigned to torpedoes.)
- ❑ A waypoint is added after Ownership if nothing is selected in the Geoplot or after the selected waypoint when a waypoint is selected.

- ⇒ To delete a waypoint, select the waypoint and press [DELETE]. The weapon or sonobuoy count is incremented appropriately.

✓ **Note:** Waypoints are only visible on the Geoplot when Ownship is selected. Waypoints can only be manipulated in the ATO Geoplot or the Nav Map. Waypoints are always visible on the Nav Map. All waypoints can be deleted at once from the Nav Map. Select Ownship and right-click. Select *Navigate>Remove Waypoints*.

**LINK:** The Link provides a secure method for sharing data with friendly platforms in the area. Information on contacts detected by OS and friendly platforms is shared with all other Link participants on Ownside. When the MH-60R is deployed from a player-controlled O.H. Perry (FFG) during a Multiplayer and/or Multi-Station game, the FFG may request control of your Helo to place flight, buoy drop or torpedo drop waypoints for you to follow. As long as he has SYNC with your helicopter, he can download your radar or acoustic data for processing on his ship.

**NAV CONTROL:** This feature is only functional in a Multiplayer and/or Multi-station game when OS is the deployed Helo from a FFG that is player-controlled. It is disabled in Single Player mode and in a Multiplayer game if your base FFG is A.I. controlled. The FFG can request control of the Helo from you and enter waypoints for you to follow.

When the FFG (SHIP) requests Nav Control to place flight, sonobuoy drop or weapon drop waypoints for you to follow, both the HELO and SHIP lights flash.

- ⇒ Click SHIP, to pass Nav control to the FFG. You do not have to grant the FFG navigation control and once granted, you do not have to follow the waypoints he issues. When the FFG has navigation control, you cannot place waypoints for Ownship from either the ATO station or the Nav Map. At any time you can flip the NAV CONTROL switch back to HELO and regain waypoint capability.
- ❑ While you are prevented from placing any type of waypoint when the SHIP has navigation control, you can still drop buoys and torpedoes before you reach the SHIP assigned drop point (which may annoy the FFG player since you have a limited number of torpedoes.)
- ❑ If you change course, deviating from the SHIP entered waypoints, you must select FOLLOW WAYPOINTS from the Orders or Ownship Menu's *Navigate* option before OS will once again return to the assigned flight path.

**DATA LINK:** This feature is only meaningful in a Multiplayer or Multi-Station game when OS is the deployed Helo from a FFG that is commanded by a different player. As long as the FFG has SYNC with your helicopter he can download data from your RADAR or ACOUSTIC processor. The Data Link switch changes position automatically when the FFG selects one type of data or the other. Make sure your Radar is

ON if the ship is requesting Radar data. It is not necessary to tune your acoustic grams to any channel for the FFG to download data.

**HYDROPHONE:** This switch controls the winch that DEPLOYS or RETRIEVES the Dipping Sonar sensor. Deploying the sensor when traveling at a speed greater than 30 knots damages the sensor. When the sensor is deployed to the desired length, click STOP to keep from deploying the entire cable.

- ❑ Dragging the dipping sensor through the water at too great a speed damages the sensor. Speeds over 1 knot will degrade reception. If speed exceeds 8 knots you will not be able to detect anything. Speeds over 30 knots will break the sensor.

**MAD:** This switch controls the winch that DEPLOYS or RETRIEVES the Magnetic Anomaly Detection (MAD) and Submarine Anomaly Detection (SAD) sensors. When the sensor is deployed to the desired length, click STOP to keep from deploying the entire cable.

- ❑ The MAD sensor deploys out behind the helo as it flies. Maintain a speed of at least 50 knots.

**Warning Lights:** These lights function the same as described in the Pilot Station. See *MH-60R Stations/Pilot Station/Pilot Station Functionality/Warning Lights* for details.

## SONOBUOY LAUNCH DISPLAYS

From this display you can launch sonobuoys immediately or through the use of waypoints. The Sonobuoy Launch Display and the placement of Sonobuoy Waypoints are covered here.

# of Buoys Loaded (# of buoys assigned to waypoints follows in parenthesis)



## To Launch a Sonobuoy

1. At the top of the Weapon and Sonobuoy Launch Display, click the button above the SONOBUOY label to display the Sonobuoy options.
2. At the right or left side of the Sonobuoy Launch Display click the button next to the type of sonobuoy to be launched. (Deep sets buoy depth at 400 ft, shallow sets buoy depth at 90 feet.) The Stores column indicates the number of buoys of each type currently aboard the aircraft. Numbers in parenthesis refers to the number of buoys of that type currently assigned to a sonobuoy waypoint.
1. Click the button to the right of the Launch label at the lower right of the Launch Display.
3. The Launch button flashes until the buoy drops. The STORES count is updated once the buoy is away.

## To Place a Sonobuoy Drop Waypoint

By default a buoy of the type currently selected in the Sonobuoy Launch Display is dropped when the Sonobuoy waypoint button is clicked. To drop a buoy of a different type:

1. At the top of the Weapon and Sonobuoy Launch Display, click the button above the Sonobuoy label to display the Sonobuoy Options.
2. At the right or left side of the Weapon and Sonobuoy Launch Display click the button next to the type of sonobuoy to be launched at the waypoint. (Deep sets buoy depth at 400 ft, shallow sets buoy depth at 90 feet.)
3. In the Waypoint panel under the Geoplot click the SONOBUOY button. A waypoint with the letter (B) beside it appears on the Geoplot display after Ownship or after a selected waypoint. The type of buoy selected in the Sonobuoy Launch Display is assigned to drop at that location.

✓ Note: The number of buoys of a given type currently assigned to a waypoint appears in parenthesis after the stores number. The parenthetical number is updated appropriately when the buoy is deployed or when the waypoint is deleted before the buoy is deployed.

4. Click and drag the waypoint to position it as desired.
5. When a waypoint is selected, waypoint information appears in the Geoplot DDI.
6. Once a buoy is assigned to a waypoint the type of buoy cannot be changed. You can delete the waypoint and insert a new one with the desired type of buoy. When a buoy waypoint is deleted the count is recalculated and stores are updated appropriately.

**TIP:** If the size and zoom of the Geoplot Display make viewing multiple waypoints difficult, switch to the Nav Map and drag the waypoints to the

desired location there. Since land is not visible on the Geoplot, moving the buoy drop points on the Nav Map helps you insure that you are not dropping a buoy over land.

## WEAPONS LAUNCH DISPLAY

The MH-60R in S.C.S. *Dangerous Waters* can carry Penguin and Hellfire missiles. Penguins can target surface ships but not land targets. Hellfire missiles can target both surface ships and land targets but has a much shorter range than the Penguin.



### To Launch a Penguin Missile

Penguin missiles can target surface ships only. The MH-60 can carry only one Penguin missile in S.C.S. – *Dangerous Waters*.

1. At the top of the Weapon and Sonobuoy Launch Display, click the button above the WEAPON label to display the Weapon Launch Display and the Weapon Presets options.
2. Click the button next to LFT OUTBD (left outboard pylon). Missiles can only be loaded on the left outboard pylon in S.C.S. – *Dangerous Waters*.
3. Click a valid contact in the Geoplot. The track number of the selected contact appears in the Target field.
4. If no contact or an invalid contact is selected, the Runout Brg field appears instead of the Target label. You must enter the bearing on which the missile is to travel when launched in the PRESETS panel.
5. Adjust presets as desired then click ASSIGN. Click or right-click on the digits to increase or decrease values. See *MH-60R Weapons Presets* below.

6. Click the button to the right of LAUNCH LFT OBRD in the lower right of the Weapon Launch Display.
- ❑ To jettison the weapon without launching, click the button to the right of JETTISON LFT OBRD.
- ❑ When the ATO Autocrew is ON, the only presets available are the Runout Brg field and the ASSIGN button. Enter the desired bearing or select a valid contact and click ASSIGN.

### **To Launch a Hellfire**

In S.C.S - *Dangerous Waters* the MH-60R carries a four-missile pod of Hellfires. Only one missile can be fired at a time and each missile is targeted separately as it becomes available. The MH-60R is loaded out with a Penguin by default. You must change the loadout at the Weapon Loadout screen accessed from the Brief Screen prior to game start. Once you have loaded Hellfires, it becomes your default loadout for subsequent games until you change it at the Weapon Loadout screen. You are provided with an opportunity to change your loadout when you return to base or land on an available landing site during gameplay.

1. At the top of the Weapons and Sonobuoy Launch Display, click the button above the WEAPON label to display the Weapon Launch Display and the Weapon Presets options.
2. Click the button next to LFT OUTBD (left outboard pylon). Missiles can be loaded only on the left outboard pylon in S.C.S. – *Dangerous Waters*.
3. The two legs of the detection cone appear in front of the Ownship symbol on the Geoplot. The legs of the cone represent the max range of the missile. Valid surface and land contacts within the confines of the cone can be successfully selected and assigned to the next available Hellfire.
4. Select the desired contact on the Geoplot and click the ASSIGN button. When a valid target is assigned, its track number appears in the Assigned Tgt field in the upper portion of the presets area. If the target is within the detection cone the LFT OBRD label below the LAUNCH button flashes indicating the weapon is locked on and can be fired. If it is not flashing, maneuver such that the target is within the detection cone. When the assigned target enters the cone, the LFT OBRD button begins to flash.

✓ **Note:** The Hellfire cannot be assigned to an aircraft, sonobuoy or submarine symbol. If a symbol for one of these is selected, the text “No Assigned Tgt” appears in the upper presets area and the launch button never enables even if the contact is within the cone.

5. Click the LAUNCH button. Once the weapon has launched, the number of next available Hellfire appears at the top of the Presets area followed in the next row by “No Assigned Tgt” appears.

6. Select the same or a new contact and click ASSIGN to assign the next available weapon to the target.
  - ❑ When a weapon is assigned to a target that is not inside the cone, the weapon cannot be launched. Once Ownship maneuvers such that the cone encompasses the assigned target, the LFT OBRD button flashes and the weapon can be launched.
  - ❑ Once a weapon is assigned to a target, the assignment stays with that target, even if another contact is selected in the Geoplot. Be sure to check the track number in the Presets area to verify the assigned target. Click ASSIGN again to de-assign a target.
  - ❑ Clicking the JETTISON button jettisons the entire Hellfire pod and any remaining weapons.

**Tip:** While you are not prevented from assigning a weapon to a valid target that is attached to a line of bearing, be aware that in most cases the symbol at the end of the LOB is at a default range, not the location of the actual contact. If you want to target a contact on a line of bearing, maneuver to send the torpedo or missile down the line of bearing, not across it.

## To Launch a Torpedo

The MK-46 and MK-50 are lightweight torpedoes and as such are meant to target submarines. They are not frequently sent out on long-range searches or used against surface ships, but used to prosecute a known subsurface contact at short range. However, you are not prevented from assigning a torpedo to any valid subsurface or surface contact.

**Tip:** Given the relatively short range of the Mk-46 and Mk-50 torpedoes (6 nm and 7 nm as modeled in *S.C.S. - Dangerous Waters*), the best strategy is to localize a subsurface contact as precisely as possible before dropping a torpedo in close proximity to the suspected location. Be sure to reset the Run To Enable (RTE) distance to an appropriate distance given your understanding of the contact's location. Be aware that if you are close enough to an enemy surface ship to reach it with your torpedoes, you are undoubtedly within range of its missiles. You are much better off targeting a surface ship with your missiles. In *S.C.S. - Dangerous Waters*, these torpedoes can be set to runout on a specific bearing or to target specific contacts.

1. At the top of the Weapon and Sonobuoy Launch Display, click the button above the WEAPON label to display the Weapon Launch Display and weapon PRESET options.
2. Click the button next to RGT INBD, LFT INBD and Left OUTBD (right inboard, left inboard and left outboard pylons) to determine which pylons are assigned torpedoes. Torpedoes can be loaded out on all three weapons pylons in *S.C.S. – Dangerous Waters*.
3. A torpedo can be assigned to a specific **bearing** or a specific **target**.
  - ⇒ **Runout Bearing:** Click the Geoplot surface to deselect any object. A default bearing of 000 appears after the Runout Brg label near

the bottom of the presets. Click or right click the digits in the Runout Brg field to set the desired bearing for the weapon to follow when it hits the water. Click ASSIGN.

⇒ **Specific Target:** Select a contact in the Geoplot. Click ASSIGN. The Runout Brg label is replaced with the Target label. The track number of the assigned target appears in the Target field. (You are not able to assign a torpedo to an invalid target. If such a target is selected, the Runout Brg label appears instead of the Target label. You must enter the desired bearing as described above. Invalid targets are sonobuoys, air contacts, Ownship and your base ship.)

4. Click/right-click the digits to adjust the presets as desired.
5. Click the button to the right of the LAUNCH button to launch the selected weapon.
  - To jettison the weapon without launching, click the JETTISON button.

### **To Place a Torpedo Drop Waypoint:**

Only torpedoes can be assigned to a weapon waypoint.

✓ **Note:** When a waypoint is placed, the autopilot immediately increases speed to 100 knots and flies to the first waypoint, slows to drop the weapon then increases speed to reach any additional waypoints. The Helo hovers when it arrives at a final waypoint.

1. Click the WEAPON button in the SONOBUOY WAYPOINTS area under the Geoplot. The ASSIGN TO WAYPOINT display appears in the Preset area listing the available weapons for assignment.
  - If you have no remaining unassigned torpedoes or all torpedoes have been dropped, the ASSIGN TO WAYPOINT display never appears when the WEAPON waypoint button is clicked.
2. Click the text of the desired pylon/weapon option in the ASSIGN TO WAYPOINT display.
3. Click the ASSIGN button in the lower right to assign that weapon to the weapon waypoint. (Click CANCEL to leave the Assign to Waypoint area without assigning the waypoint.)
  - A tiny square waypoint is inserted on the Geoplot at the end of a flight path. A tiny T (for Torpedo) appears beside the waypoint. Click the square waypoint marker to select it and drag it to the desired location.
  - If other waypoints already exist, the waypoint is inserted after the selected waypoint. If nothing or the Ownship symbol is selected, the waypoint is inserted after the Ownship symbol.
  - Waypoints are only visible in the ATO Geoplot when Ownship is selected. They are always visible on the Nav Map.

4. The Weapon Presets area appears showing the presets for the weapon on the selected pylon. When a weapon waypoint is placed, the ASSIGN button is activated automatically and the default settings are assigned including a runout bearing of 000. To change the default bearing or other presets, click ASSIGN to toggle the button to its OFF state. Click or right-click the digits in the presets area to set the weapon presets as desired.
5. If you have clicked ASSIGN to change the presets and runout bearing, click ASSIGN again to assign the weapon with these new presets to the waypoint. (The ASSIGN button is ON when the button is solid green with black letters. The weapon does not drop unless assigned to the waypoint.)

**Tip:** Zoom the view to better locate the waypoint. Because of the small confines of the Geoplot it is sometimes easier to drag the waypoint on the Nav Map. Using the Nav Map to place weapon waypoints helps insure that the drop point is over water and not over land. Land is not visible in the Geoplot.

- ✓ **Note:** If all torpedoes are already assigned to a target or bearing, no waypoint can be placed. Unassigning a torpedo on a pylon frees it to be assigned to a waypoint. If a torpedo is launched manually before arriving at a weapon drop point, the waypoint is deleted. The assigned presets remain with the weapon even if the waypoint is deleted. You will need to unassign the weapon to create a new waypoint if all torpedoes are currently assigned.

## MH-60R WEAPON PRESETS

The presets for weapons available to the MH-60R in S.C.S. – *Dangerous Waters* are seen below. Presets appear in the center of the Weapon Launch Panel in the ATO station.

### **Hellfire Missile Presets**

The Hellfire can target both land and surface ship targets:

**Max Range:** 4.3 nm

**ASSIGN (button):** The only preset is the ASSIGN button. When the Hellfire weapon is selected, a cone appears in front of the OS Symbol on the Geoplot. When a contact is within the confines of the cone, select the symbol on the Geoplot then click the button to the right of ASSIGN to lock on the target. The LFT OBRD button enables and begins flashing. Click the flashing button to launch the missile. After launching a Hellfire the next Hellfire becomes available and must be assigned to the desired target.

### **Penguin Missile Presets**

The Penguin can only target surface ships.

**Max Range:** 22 nm

When ATO Autocrew is ON he automatically sets presets based on the contact selected.

**Enable:** Click or right-click digits to enter the range (in nautical miles) at which the missile is to enable.

**Destruct:** Click or right click digits to enter the range (in nautical miles) at which the missile is to destruct if no target is encountered. (The maximum destruct range is the maximum range of the missile: 22 nm.)

**Seeker:** Click in the text field to select WIDE or NARROW search cone.

**Target / Runout Brg:** One of these labels appears depending on what is or is not selected in the Geoplot.

**Target:** Assigns the Penguin to a specific target and lists the target's track number in this field. This label appears when a valid contact is selected in the Geoplot and ASSIGN is clicked. Valid contacts are surface ships that are not attached to a Line of bearing. You cannot target your base ship. The Runout Brg field appears when you have selected an invalid contact and click ASSIGN.

**Runout Brg:** Sets the bearing on which the missile heads when launched. This label appears if nothing or an invalid contacts is selected in the Geoplot. The runout bearing defaults to 000.

## Torpedo Presets

The MH-60R in S.C.S – *Dangerous Waters* can carry Mk 46 and Mk 50 torpedoes.

**Mk 46:** Maximum range of 6 nm (12,000 yards); maximum speed of 45 knots; maximum depth of 1500 feet (457 meters).

**Mk 50:** Maximum range of 7 nm (14,177 yards); maximum speed of 55 knots; maximum depth of 3,600 feet (1,100 meters).

Both torpedoes have the following presets in the MH-60R. Click/right-click to adjust the settings.

**Acoustics:** Sets **Active** or **Passive** search mode. Click to toggle between these two sonar mode options.

**Search Pattern:** Sets Search pattern to **Snake** or **Circle**: Click to toggle between these two search pattern options.

**Floor:** Set the depth below which the weapon will not go.

**Ceiling:** Set the depth above which the weapon will not go.

**Depth:** Set the depth at which the weapon travels.

**Speed:** Set the speed at which the weapon travels.

**Target / Runout Brg:** One of these labels appears depending on what is or is not selected in the Geoplot.

**Target:** Assigns the torpedo to a specific target and lists its target track number in this field. This option automatically sends the

weapon on the appropriate intercept course to attack the selected track once the weapon enters the water. This label appears when a valid contact is selected in the Geoplot. Air contacts, Sonobuoys your OS Base ship and contacts that have only a line of bearing and have not yet been assigned a category cannot be assigned as a target. In the case of the LOB contact, too little information is known. You can set a runout bearing to attempt to intercept the contact.

**Runout Brg:** Sets the bearing on which the torpedo heads after it enters the water. This option appears when no contact, an air contact, a sonobuoy, Ownship, your base ship or a contact that is unknown and/or is attached to a Line of Bearing is selected in the Geoplot. Click/right-click the digits to enter a specific bearing for the torpedo to follow once it enters the water. The runout bearing defaults to 000. Once a new bearing has been entered, that bearing remains the default bearing for the other torpedo(s) until you change it again.

**Run to Enable:** Sets the distance in yards at which the weapon will enable and begin its search pattern.

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## MH-60R: ACOUSTIC STATION [F3]

In S.C.S. - *Dangerous Waters* the MH-60R helicopter can carry four types of sonobuoys: DICAS, DIFAR, VLAD and BT and can process any LOFAR buoys that may appear in a mission. See *Training/Sonar School/Sonar/Sonobuoys* more information on these sonobuoys. In the MH-60R sonobuoys are launched from the ATO Station [F2]. Transmitted sonobuoy data are processed and viewed in the Acoustic Station.

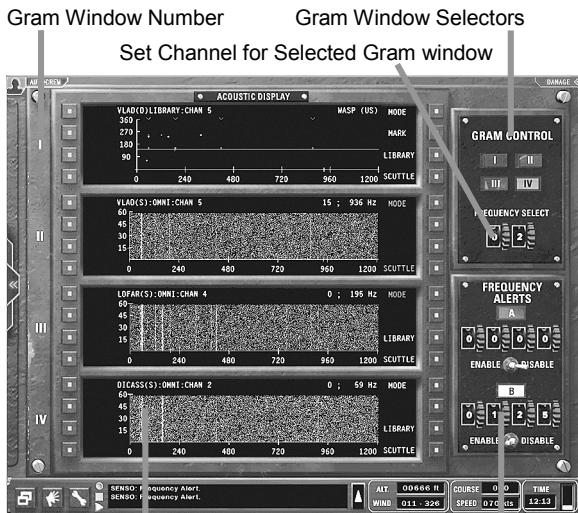
Regardless of which Ownside platform launched the sonobuoy, if a buoy is 'hot' (detecting a contact) the transmitted data can be processed in the MH-60R's acoustic station if a Acoustic Data Display window (gram) is tuned to the transmitting channel. The Nav Map sonobuoy symbol for a 'hot' buoy has a red center.

- ✓ **Note:** All sonobuoys regardless of who launched them have track numbers that begin with 0. Contacts that you or your Autocrew mark in your acoustic station, have track numbers that reflect your own platform ID (track) number.

## ACOUSTIC DATA DISPLAY WINDOWS

If "hot" buoys are detected at mission start, the four Acoustic Data Display Windows, also called grams, are tuned to transmitting channels, even if Acoustic Autocrew is not on. These will all be set to Omni mode if the Acoustic Autocrew is not on.

If Acoustic Autocrew is not on at mission start and buoys are subsequently dropped and begin transmitting (are 'hot'), you must tune the display windows to the desired channel yourself. The parts of the Acoustic Display are described below.



Acoustic Data Display Window (Gram)

Frequency Alert Field

- ✓ **Note:** The MH-60R can process 16 buoys at once. Because of in-game screen space restraints only four data display windows are visible in this acoustic station in S.C.S. – *Dangerous Waters*.

## To Enter a Frequency Alert

To be alerted when a specific frequency is detected by a sonobuoy, enter the desired frequency into one of the Frequency Alert fields.

- ⇒ Click or right-click the digits or the thumbwheels in the Frequency Alert fields to increment or decrement the numbers until the desired frequency is displayed.
- ⇒ Click ENABLE to move the alert switch into the on position. When the designated frequency is detected the alert light flashes.

## To View Sonobuoy Data

The following steps allow you to view and process data from transmitting buoys. A hot buoy has a red center when viewed on the Nav Map.

1. To determine the channel on which a buoy is transmitting, visit the Nav Map [F5]. The channel in use by a buoy appears on the Nav Map next to its NTDS symbol and appears in the DDI when the symbol is selected.
2. At the Acoustic Station [F3], select one of the four Acoustic Data Display Windows labeled with Roman numerals by clicking the associated button in the GRAM CONTROL panel.
3. Click or right-click on the CHANNEL SELECT thumbwheels or digits to increment or decrement the numbers until the desired channel number

is entered. This tunes the selected window to the data transmitting on the selected channel. If a buoy is transmitting on the channel, there may be a short delay until that data appears.

4. Clicking a different Gram Control button moves the CHANNEL SELECT Thumbwheels to indicate the channel currently entered for the selected Gram Display Window.

✓ **Note:** Wait until your selection has taken effect before selecting a different Gram Control button or it will revert to the former setting.

## Types of Sonobuoy DATA

What appears in a Gram Display Window depends on the type of buoy transmitting and the mode selected. See *Training/Sonar School/Sonobuoys* for more information on sonobuoys.

**DICASS:** Omni, Directional and Active modes are possible.

**DIFAR:** Omni and Directional modes are possible.

**VLAD:** Omni and Directional modes are possible.

**BT:** Only Sound Speed Profile (SSP) mode is possible.

**LOFAR:** Only Omni mode is possible. (LOFAR buoys may appear in a mission but they are not carried by any controllable platform in S.C.S. – *Dangerous Waters.*)

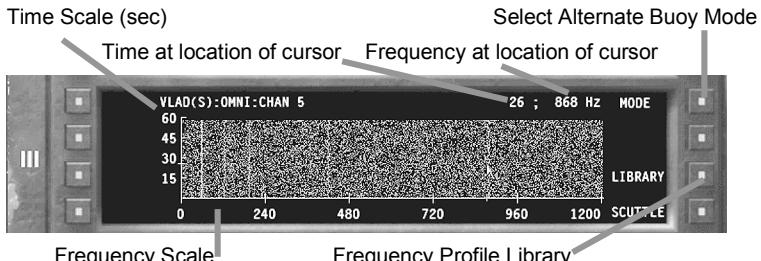
## Display Window Requirements by Mode

- ❑ **Omni** mode requires one Gram Display Window and reports only frequency data. Omni data indicates only that frequencies are detected. They cannot be marked, but they can be used to classify platforms using the Frequency Profile Library.
- ❑ **Directional** mode requires two Display Windows, one containing both bearing and frequency data the other Omni (frequency only) data. Bearings can be marked in Directional mode and appear on the Nav Map at a default range.
- ❑ **Active** mode requires three windows. One is used to transmit and receive data the other two appear blank and indicate they are supporting the active mode channel. Contacts can be marked but the sound profile library is not available. Both bearing and range data are reported to the Nav Map when Active contacts are marked.
- ❑ **BT/SSP** mode provides the depth of the thermal layer in that location. See more about the acoustic layer in *Training/Sonar School/Underwater Sound Propagation*. Submarines frequently use the layer to hide. Knowing the depth of the layer in the area helps you determine a depth for buoys and the dipping sonar.

## Omni Mode Frequency Data

Omni mode provides frequency data only. It indicates something is out there and is emitting the detected frequencies. The frequencies cannot be marked and there is no indication of the bearing to the contact. Omni is

useful for comparing the detected sound profile to a library of known sound profiles. Click the button to the right of the LIBRARY label to access the Sound Profile Library.

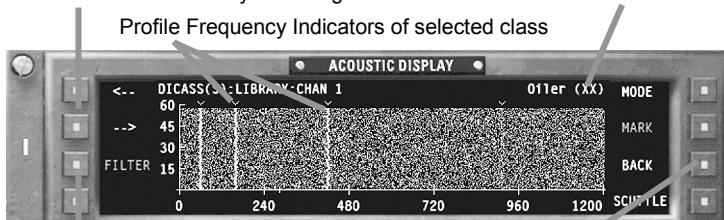


## Classifying a Contact with the Profile Library

When a Sonobuoy is in ONMI or Directional Mode, search the Sound Profile Library to find the frequency profile of the class that most closely matches the frequency profile of the detected contact.

1. Click the Library button to display the Profile Library Controls and data. The LIBRARY button label becomes BACK and the Filter button and arrow buttons become active.

Click Arrow Buttons to cycle through Profile List      Selected Class Profile



2. Click the FILTER button on the left to reduce the number of profiles in the list to those that most closely match the profile of the detected contact.
3. The position of the Profile Frequency Indicators (inverted carets) depicts the frequency profile for the Class Profile selected in the top line.
4. Click the right and left arrow buttons to cycle through the profile list until the Profile Frequency Indicators line up with the detected frequency profile.
5. Find the same contact on the Nav Map and enter the classification determined here using the contact's right-click Contact Menu.

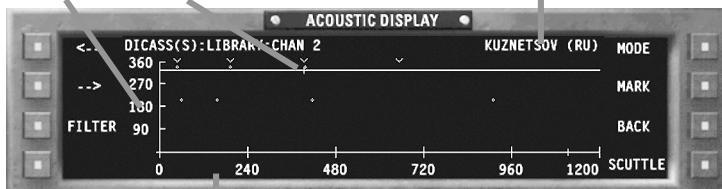
✓ **Note:** The Profile Library is more useful in Directional mode since contacts can be marked and the selected classification is applied to the selected contact at that time. In Directional mode the Frequency Indicators line up with the dots on the selected bearing. Click on a

dot to select the frequencies on that bearing then click MARK. When the marks line up with the dots and you are satisfied with the selected classification, click MARK.

## Directional Mode Data

Directional mode requires one additional window, which must be set to 00 before Directional mode can be set. Directional Mode provides bearing information on detected frequencies. Click in the window to move the cursor to that location. The horizontal line indicates the bearing of the cursor location; dots indicate frequencies. The following display shows directional data and Library mode.

Bearing Scale      Bearing/Range Cursor      Class of Selected Profile



Frequency Scale

1. To mark the frequency detected on a specific bearing, click a dot in the window to move the cursor to that bearing location.
2. Click MARK to send the bearing data to the Nav Map. The contact symbol appears at a default range on the bearing marked. The assigned track number appears in the crew report and following the Channel number in the top row of the display window.
3. Click the LIBRARY button to access the Frequency Profile Library. Look for dots that line up under the Frequency Profile Indicators (carets) to identify the probable class of the contact.

✓ **Tip:** You must click carefully to mark in directional mode. Listen for the crew to insure that the contact was actually marked.

## Active Mode Data

A DICASS sonobuoy set to active mode provides both bearing and range data on the detected contact. Two additional display windows are required to support a buoy in active mode.

1. Set a gram display window to a channel transmitting DICASS buoy data. (On the Nav Map the channel on which a buoy is transmitting appears next to its NTDS symbol and appears in the DDI when the buoy symbol is selected.)
2. Set two other display windows to Channel 00 (no buoy data). These are needed to support a buoy in active mode.
3. In the DICASS buoy gram, click the MODE button to cycle modes until ACTIVE is selected. The selected mode is seen in the top line of the display window following the buoy name. The two blank grams now

show information indicating they are supporting the Gram set to Active mode.

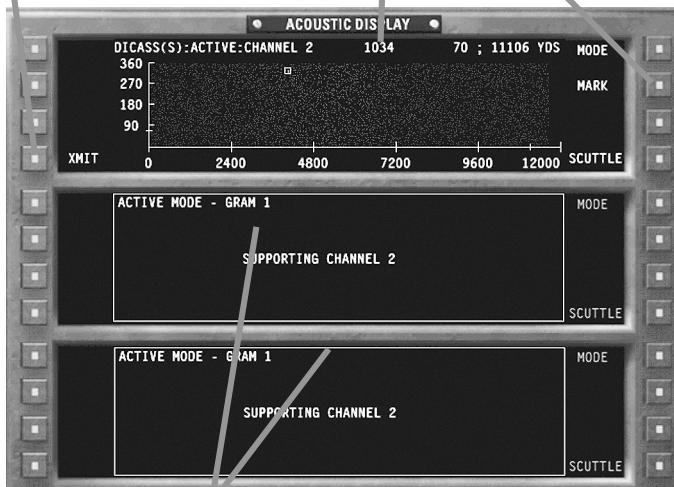
4. Click the XMIT button to begin transmitting continuous active pings. Bright dots indicate contacts. It may take several returns to see a contact against the noise.
5. Click the contact to move the cursor to that position.
6. Click the MARK button to send the bearing and range data of the contact to the Nav Map. The Track number assigned when the contact is marked appears in the top row following the channel number.
7. After two or more minutes, mark the contact again to update the contact position on the Nav Map.
8. Click the MODE button to switch to Omni or Directional Mode.

✓ **Note:** If a gram is in use supporting a gram in Directional or Active mode, its channel cannot be changed. Switch the Gram that is in Directional or Active mode to OMNI mode to free the supporting Grams for other purposes. If Acoustic Autocrew is ON, he will change your channel selections back to those of his own choosing.

Transmit

Click to mark selected contact

Track # Assigned to selected contact



Active mode requires two supporting channels

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## MH-60R: RADAR STATION [F4]

In S.C.S. - *Dangerous Waters* the MH-60R's radar detects both surface and air contacts. Its range depends on Ownship's altitude. Marking contacts with the radar sends bearing and range data to the Nav Map.

### DETECTING AND MARKING RADAR CONTACTS

1. Click the POWER switch to ON to activate the radar.
2. In the lower left of the console click the desired range to view in the scope.
3. If desired, enable range rings in the upper left of the console and select the scale of the rings.
4. Contacts appear on the scope as bright dots. Click on a contact to select it.
5. Click MARK on the right of the console to mark the contact.

On the Nav Map a symbol indicating Unknown Platform/Unknown Alliance appears on the Nav Map at the end of a yellow line of bearing at the range and bearing where it was detected. When a contact is initially marked a contact number is assigned. Its position is updated on the Nav Map with subsequent marks. See the *Navigation Station* chapter of this manual for a complete description of track numbering in S.C.S. – *Dangerous Waters*.

✓ **Note:** If Radar Autocrew is ON you are prevented from moving the cursor or marking contacts.

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## MH-60R NAVIGATION STATION [F5]

The Navigation Station functions identically from platform to platform. The basics of the Nav Station are covered in the *Navigation Station* chapter of this manual.

### OWNSHIP/ORDERS MENUS

Right-click on the Ownship symbol on the Nav Map to display the Ownship menu. The majority of the functionality contained in the Ownship Menu is also contained in the Orders Menu. These are described in MH-60R Stations/ Task Bar/Orders Menu earlier in this chapter. The rest of the Ownship Options require the use of the Nav Map. These are the same from platform to platform. See *Navigation Station/2D Navigation Map/Ownship Menu*.

#### **Navigate:**

**Return To Base:** When your MH-60R is deployed from a FFG in the mission, this option appears in the Ownship Menu. The platform ID for your FFG base is followed by "(Base)" on the Nav Map. Selecting this

option sends Ownship on a track to automatically land on your Base ship. On the Nav Map you will see your OS symbol transit to approximately one nautical mile behind your Base ship, then turn and approach the ship and land. The loadout screen appears. Change your loadout immediately if desired. Once you close the loadout screen, you have lost the opportunity to reload until the next time you land. (The MH-60R may also be launched from a land base in some scenarios. If your MH-60R was created as a standalone aircraft (not launched from any platform or airport), the *Return To Base* option never appears.)

## CONTACT MENU

The Contact Menu appears whenever you right-click on a contact's NTDS symbol on the Nav Map. Most Contact Menu options are the same from platform to platform. See *Navigation Station/2D Nav Map/Contact Menu*. However there are several options that are unique to the MH-60R. The following Contact Menu options are available when you are commanding the MH-60R in S.C.S. - *Dangerous Waters*.

**Land On:** Available only on contacts that have a helicopter landing pad defined by the mission creators. Select this option to order Ownship to land on the selected contact. To take off again, order an altitude 100 feet greater than that of the surface you are on. Current altitude is seen in the ALT field of the task bar. This is altitude above sea level.

**Engage With:** The weapons appropriate for the target are enabled as seen below.

**[X] Pylon:** Missiles can only be loaded on the Port Outboard (PO) pylon.

**Mk 46 or Mk 50 Torpedo:** When selected, a torpedo or mine is dropped with the default presets if you have not changed presets for the selected weapon at the ATO Weapons Display.

**Penguin Missile:** Available only when a Penguin missile is loaded out. Selecting this option launches the Penguin missile at the selected contact. If the target is out of range (22 nautical miles) the missile fails. You are not prevented from firing the missile at targets behind you but if you do the missile will likely acquire something else.

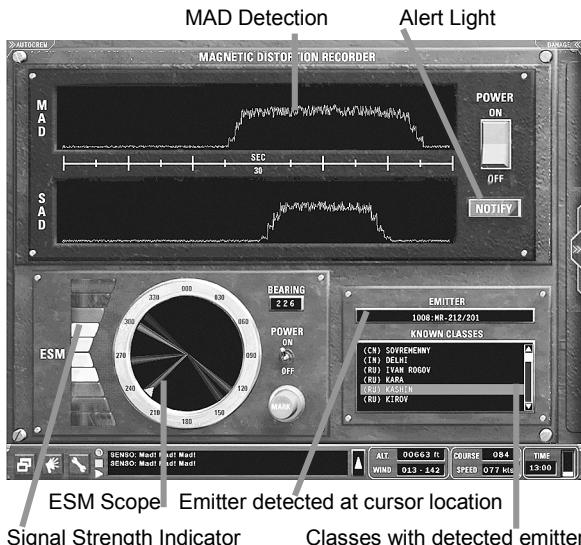
**Hellfire Missiles:** This option is only available when the Hellfire pod is loaded at the Weapons Loadout Station. The option is greyed out if the launch parameters for the missile are not met. The selected contact must be within a 30-degree cone that extends 4.3 nautical miles in front of Ownship. The option is enabled and can be selected when the target is within the detection cone. Four missiles are loaded in the pod. Each is fired separately.

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## MH-60R MAD/ESM STATION [F6]

The magnetic and submarine anomaly detection recorder and the Electronic Support Measures (ESM) scope share the MAD/ESM station. The MAD/SAD Recorder provides for passive detection of submerged

submarines. The ESM scope allows passive detection, marking and classification of surface and air contacts.



## MH-60R MAD DISTORTION RECORDER

Large metal objects, like submarines, create disturbances in the earth's magnetic field and these disturbances or anomalies, can be detected from above. The data from the Magnetic Anomaly Detector (MAD) and Submarine Anomaly Detector (SAD) are recorded in the top panel of this station. Distortions detected by these sensors provide a strong indication that a submarine is in the area. The MAD/SAD plot provides information only. There is no interaction.

1. Press [F2] to access the ATO station then click DEPLOY in the MAD panel to lower the MAD sensor or from the Task Bar's Orders Menu select SENSO>Mad Sensor>Stream.
2. Maintain an altitude of 200-250 feet. The MAD Sensor is at the end of a 150-foot cable. It is dragged behind/under the Heli depending on OS Speed. The sensor should not drag in the water.
3. In the MAD/ESM Station [F6], click the POWER switch to the ON position in the MAD Distortion Recorder panel.

The NOTIFY alert light is illuminated and a crew report ("MAD! MAD! MAD!") is heard when the MAD sensor detects a contact. The contact is automatically marked on the Nav Map.

### Using MAD/SAD Effectively

- ❑ The MAD sensor has an effective range of about 1000 yards. At altitudes above 1000 ft the sensor does not detect anything.

- At an altitude of 500 feet, the sensor detects underwater contacts in the 500 feet directly beneath the helicopter. It also marks surface contacts in the immediate area.
- The thermal layer does not mask a submarine from the MAD sensor. Going below 500 ft is a submarine's best defense against MAD and SAD.
- The SAD sensor is similar to the MAD sensor but has a more limited range of around 750 yards.
- SAD reports submerged contacts only.
  - ⇒ Patrol slowly at a low altitude (approximately 200-250 feet) when searching with MAD/SAD sensors. Because of their short ranges, a spike indicates the Heli is directly over the target.
  - ⇒ If the contact is known to be hostile, drop a torpedo immediately.
  - ⇒ If the contact is unknown, launch buoys to further localize or identify the contact. When the contact is determined to be hostile, drop torpedoes.

✓ **Note:** The MAD sensor has been removed from the MH-60R helicopters but is retained in the S.C.S. - *Dangerous Waters* for gameplay purposes.

## MH-60R ESM PANEL

The ESM sensor detects radio and radar transmissions from other ships and aircraft. These detections display as red wedges of varying size and intensity on the ESM scope. The position of the wedge indicates the bearing on which the transmission is detected. The ESM Panel consists of the following components.

**Signal Strength Indicator:** The light scale indicates the strength of the selected detection. Green lights indicating low signal strength, yellow a signal of medium strength, and red in the outer positions indicate a strong signal. A strong signal usually indicates a contact at close range.

**BEARING:** This field displays the exact bearing at the location of the cursor.

**EMITTER:** Displays the name of the detected emitter for the contact selected in the ESM Scope.

**KNOWN CLASSES:** A list of ship or air classes known to use an emitter of the detected type appears here.

### To Mark a Contact at the ESM Console

1. Ensure that ESM Autocrew is OFF. The cursor cannot be moved when ESM Autocrew is ON. Click the Autocrew slider in the upper left of the station to toggle the state of the Autocrew.
2. Click the power switch to the ON position.
3. Click the desired contact to select it. The position of the red triangle cursor indicates the bearing of the contact.

4. Click MARK. The bearing information of the selected contact is sent to the Nav Map and a track number is assigned to the contact. Contacts marked by the ESM sensor appear on the Nav Map at the end of a red line of bearing at a default range of 20 nm.
5. Once the ESM sensor has marked a contact, a track number appears in front of the emitter name in the Emitter field each time that contact is selected in the ESM scope.

### **Classifying a Contact at the ESM Console**

The ESM sensor provides information on known classes that have the detected type of emitter. While it is not always possible to positively identify the class of the emitter in the ESM station, the Known Classes Library can help narrow the list of possible classes.

1. Click on a contact in the ESM scope to select it.
2. Click on a contact name in the KNOWN CLASSES list. You may need to scroll through a long list if many ship or air classes are known to use the same sensor.
3. With the class name selected, click MARK. The selected class name is assigned to the selected contact and on the Nav Map the 3D model for that class name appears when the NTDS symbol for the contact is selected on the Nav Map.

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## **MH-60R DIPPING SONAR [F7]**

The MH-60R carries the Airborne Low Frequency Sonar (ALFS) AN/AQS-22 dipping sonar. This system has a longer range than most dipping sensors in use by the U.S. Navy. The sensor can be operated in passive or active mode. In passive mode, frequency profile information is available to assist with contact classification.

### **Deploying the Dipping Sonar:**

1. Hover between 50 – 300 feet. The sonar cannot detect anything if dragged at greater than 8 knots. The sensor breaks if it is dragged through the water at a speed of 30 knots or greater.
2. At the ATO Station [F2], stream the hydrophone. In S.C.S. - *Dangerous Waters* the cable is 400 long when fully deployed. The hydrophone scope in the Dipping Sonar Station provides a visual indication of how much of the cable is deployed. It is not necessary to deploy the entire length of the cable. Click STOP in the ATO Stations HYDROPHONE panel to stop the winch.
3. In the Dipping Sonar Station [F7] click ACTIVE or PASSIVE at the top of the screen to select the desired mode.

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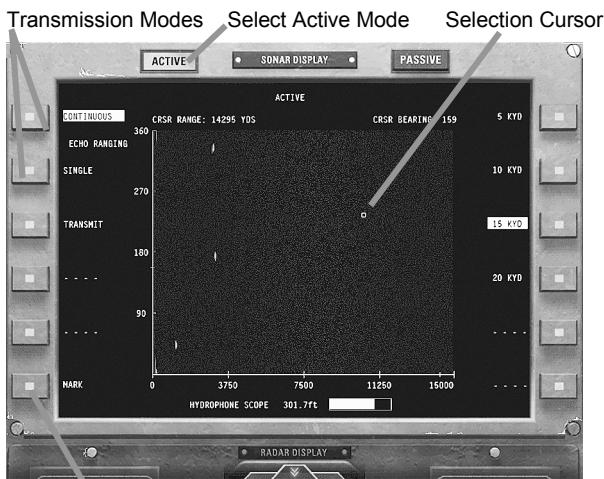
**Tip:** You may want to launch a BT to determine the depth of the layer in the area to help determine how much of the cable to deploy.

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- ✓ **Note:** In actuality the dipping sonar cable is over 2,000 feet long. For game play purposes the max length has been shortened in S.C.S. – *Dangerous Waters*.

## Active Dipping Sonar

1. Once the dipping sonar is deployed as described above, click ACTIVE at the top of the Dipping Sonar station.
2. Click the button indicating the desired range scale at the right of the console.
3. Click the CONTINUOUS or SINGLE button to select the desired type of echo ranging transmission (ping.)
4. Click the TRANSMIT button. Contacts appear as larger or brighter dots against the noise.
5. Click a contact to select it with the cursor.
6. Click the MARK button to send the bearing and range of the selected contact to the Nav Map. The first time a contact is marked a track number is assigned, that number is updated with subsequent markings. Contacts detected with the Dipping Sonar in active mode appear on the Nav Map at the end of a green LOB.



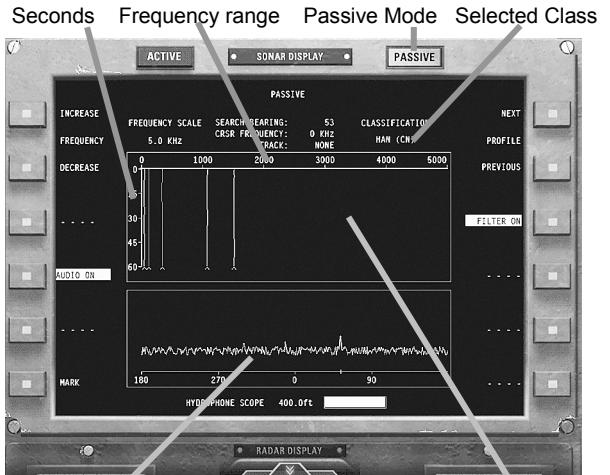
**MH-60R Dipping Sonar Active Mode**

## **Passive Dipping Sonar**

1. Once the dipping sonar is deployed as described above, click PASSIVE at the top of the Dipping Sonar station. Contacts appear as spikes in the background noise in the lower Narrowband Bearing Search Display. No contacts can be detected if OS speed is greater than 8 knots.
2. Click and drag the cursor along the Narrowband Bearing Search in the lower window and center the cursor over the contact.
3. When three or more frequencies are detected on a given bearing, lines appear in the upper Narrowband Waterfall. Click at the tip of a spike to see the detected frequencies.
4. Click the MARK button to mark the contact. The default classification that appears under the Classification label is assigned to the contact.
5. If desired, click the INCREASE or DECREASE frequency button to change the frequency scale in the display.

## **To Refine the Classification of a Marked Contact**

1. Ensure the Profile filter reads FILTER ON. When on, the filter presents you with the class names of the profiles that most closely match the selected contact. The more frequencies (lines) that are detected, the better your chance of an accurate classification. Five or more lines can narrow the search to one or two possibilities.
2. Click on a detected contact in the Narrowband Search display then click the NEXT and PREVIOUS buttons to cycle through the available profiles. The profile of the selected class is represented by carets that display at the bottom of the waterfall. Your task is to find a profile that most closely matches the lines of the detected frequencies.
3. When you find a likely match, click MARK to update the Class assigned to the contact. (Select the contact on the Nav Map to see the current classification.)



Seconds Frequency range Passive Mode Selected Class  
 Narrowband Bearing Search Narrowband Frequency Waterfall

### MH-60R Dipping Sonar - Passive Mode

## MH-60R AUTOCREW

The MH-60R has six Autocrew functions. An Autocrew slider in the upper left corner of a station indicates that an Autocrew function is available. When an Autocrew is ON, a silhouette of the crewman is visible on the Autocrew slider. The MH-60R also has an Auto Pilot. This Auto Pilot function is not associated with an Autocrew slider button but is covered here.

- ⇒ Click the text on an Autocrew slider to toggle its state or select Autocrew from the Orders Menu then the appropriate crewmember to toggle its state. A checkmark in front of the menu item indicates the Autocrew is ON. Autocrew can also be selected in the Options Screen. During gameplay press [Esc] then select *Options>Crew*.

## MH-60R ACOUSTIC AUTOCREW

When ON, the MH-60R Acoustic Autocrew sets hot sonobuoys to Directional mode and marks contacts. He can only mark contacts in Directional mode. He also assigns classification, but he is not speedy.

**Your Task:** You must set DICASS buoys to ACTIVE Mode and mark active contacts yourself. You will need to turn Autocrew OFF to complete this task. When you set windows to channel 00 in anticipation of supporting a DICASS buoy in Active mode, the Autocrew may tune the empty channels to something else if he is on. You can also classify contacts in passive mode more quickly and in some cases more accurately than your Autocrew.

## MH-60R ATO AUTOCREW

When ON, ATO Autocrew enters Penguin missile and torpedo presets appropriate for the assigned target or assigned bearing. Presets are greyed with the exception of the Target/Runout Bearing and the ASSIGN button

**Your Task:** For torpedoes and the Penguin missile you must click the desired target in the Geoplot or enter the desired runout bearing and click ASSIGN. The Autocrew makes no inputs for Hellfire missiles. You must make all target selections and click ASSIGN when the target is within the Hellfire target cone. You must launch all missiles and torpedoes yourself. Torpedoes can be assigned to a weapon drop point. The weapon must be assigned to a valid target (track number) and the ASSIGN button must be clicked before the Autocrew can make appropriate enable range settings. When the selected target is assigned and the preset label remains Runout Brg, this indicates the target is invalid for the weapon. Invalid targets are aircraft, sonobuoys, your base ship, and land targets.

## MH-60R AUTO PILOT

The Auto Pilot is not the same as other Autocrew functions. There is no Autocrew slider associated with this function. Auto Pilot can be turned OFF only at the Pilot Station when a joystick is in use. It is always ON when you are not at the Pilot Station. The Auto Pilot keeps the helicopter aloft and follows your last orders or waypoints while you attend to tasks at other stations.

You must manually set the Auto Pilot switch to DISABLE then subsequently move the joystick to take joystick control of the aircraft. If you set Auto Pilot to DISABLE upon entering the Pilot Station, but the joystick is not moved, the Auto Pilot is still on until you move the joystick. The Auto Pilot is set to ENABLE automatically whenever you leave the Pilot Station and must be disabled again each time you return to the Pilot Station. Setting the switch to DISABLE when no joystick is installed has no effect. For a full listing of the MH-60R Auto Pilot functionality see *MH-60R Stations/MH-60R Pilot Station/MH-60 Pilot Station Functionality* then *Auto Pilot*. See also *MH-60R Stations/Pilot Station/Piloting the MH-60R With a Joystick*.

## MH-60R COUNTERMEASURE AUTOCREW

When ON, the Countermeasure Autocrew (Auto-Countermeasures) launches chaff and flares when a missile is locked on Ownship. He also takes evasive maneuvers to avoid the incoming missile. In addition to the Autocrew slider, this function is activated in the Pilot Station by setting the toggle switch to AUTO in the Countermeasure Launch Panel.

**Your Task:** You are not prevented from launching chaff and flares as you see fit. If Ownship is following waypoints when evasive maneuvers are taken, you must select *Navigate>Follow Waypoints* from the Orders or Ownship menu to reassign OS to the designated waypoints.

## **MH-60R DIPPING SONAR AUTOCREW**

When ON, the Dipping Sonar Autocrew marks contacts in passive mode. He does not classify contacts and has no role in active sonar.

**Your Task:** You must deploy the Dipping Sonar, set the mode to Active or Passive, and classify contacts in Passive mode. You must also change the displayed frequency range as desired. Dipping Sonar Autocrew has no function in Active mode.

## **MH-60R ESM AUTOCREW**

When ON, the ESM Autocrew marks contacts but does not classify them.

**Your Task:** You are prevented from doing anything in the ESM console when the ESM Autocrew is on. You must turn ESM Autocrew off to perform any tasks in the ESM station. It is your task to classify contacts by identifying the probable contact from the list of classes known to carry the detected emitter. See *MH-60R Stations/MAD/ESM Station/ESM* for information on classifying contacts in the ESM Display. You are not prevented from turning the MAD sensor ON or OFF.

## **MH-60R RADAR AUTOCREW**

When ON, Radar Autocrew periodically marks all contacts on the radar screen. This updates the bearing and range data for each radar-detected contact and marks any new contacts as they appear.

**Your Task:** The cursor cannot be manipulated manually and the Mark button is disabled when the Radar Autocrew is ON. If you want to mark contacts yourself you must turn the Autocrew off using the slider or the Orders Menu's *Autocrew>Radar* option.

## *SECTION 9*

# *P-3C ORION STATIONS*



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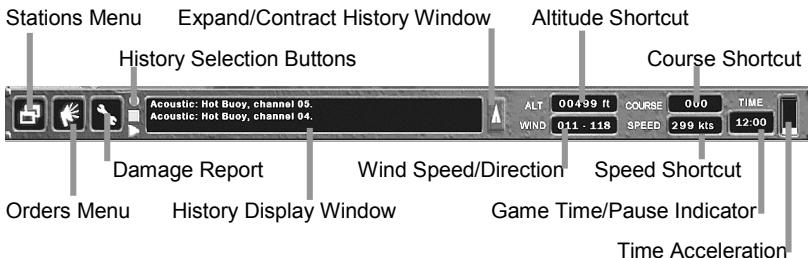
## 9: P-3C ORION STATIONS

For many years the P-3C Orion was primarily an ASW Maritime Patrol aircraft. In recent years its role has been expanded to include battlefield surveillance and its loadout now includes strike weapons in addition to ASW torpedoes and anti-ship missiles.

- ✓ **Note:** The default view when entering a mission is the Navigation Station. The Navigation Station functions the same on every controllable platform and is covered only once in the manual. See *Navigation Station*. Some Nav Station information unique to the P-3C is contained in the abbreviated *P3-C Navigation Station* portion of this section.

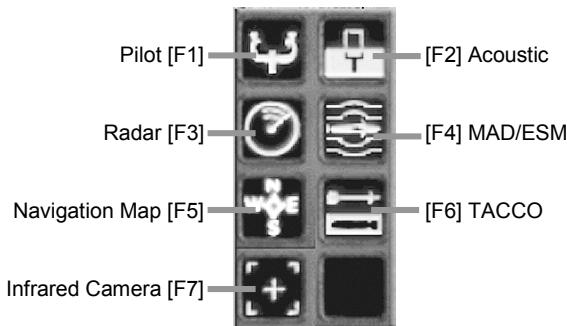
### P-3C TASK BAR

The P-3C Task Bar has several unique elements as described below.



### STATIONS MENU

Click the Stations Menu button to expand the selection menu. Select an icon to jump to that station or use the associated Hot Key. The default Hot Keys are seen here.



## P-3C ORDERS MENU

The Orders menu provides a means for quickly issuing a variety of commands from any station. The commands available for the P-3C are explained below.

### **Navigate:**

**Return to Base:** Select this option to order the plane to return to the launching airport and land. If the mission creator added the P-3C as a standalone platform, this option does not appear. When this option is selected the Auto Pilot steers the aircraft back to the base airport and lands it. The plane maneuvers to approximately 6 nautical miles beyond the airport then turns to make its approach. Once OS lands, the Weapon Loadout Screen appears allowing you to reload or change the weapons currently loaded. There is a delay of 3 minutes before you can take off again after landing. If Aircraft Quick Launch is ON, this delay is reduced to 20 seconds. A timer appears on the Nav Map displaying the amount of time remaining until launch is possible. Your controls are disabled until the time to launch has been achieved. (If you are playing with a joystick, fly the plane to your base and land it manually.)

- Be warned that once you close the Weapon Loadout window you cannot open it again. You must wait until you take off and land again.
- ⇒ **To take off again after landing:** Enter a speed of 200 kts and wait. Once you are airborne order a new course and altitude and change speed as desired.

**Speed:** Displays a submenu of options that allow you to quickly set OS speed to High: 364 kts, Med: 263 kts or Low: 154 kts.

**Altitude:** Displays a submenu of options that allow you to quickly set OS altitude to High: 28,989 ft, Medium: 13,598 ft, Low: 677 feet or the appropriate altitude for a MAD search: ~300 feet.

**Autocrew:** Displays a submenu of P-3C Autocrew options. Select an option to toggle its state. A checkmark indicates the Autocrew member is ON. (A complete description of P-3C Autocrew functionality is found at the end of this section.)

**Auto-Countermeasures:** Activated in the Pilot station Countermeasure Launch Panel. When ON the Autocrew launches chaff and flares and takes evasive maneuvers when a missile is locked on OS.

**Acoustic/Sonobuoys:** When ON Acoustic Autocrew sets gram displays to available appropriate channels, sets directional mode and marks contacts.

**Radar:** When ON Radar Autocrew marks any contacts that appear consistently.

**ESM:** When ESM Autocrew is ON he marks all contacts detected by the ESM sensor.

**TACCO:** When ON TACCO Autocrew assigns torpedo presets for targets you select.

**Launch Pylon:** This option appears only when a weapon is assigned to a specific target or bearing at the TACCO Station either via the ASSIGN button or weapon waypoint. Select the desired Pylon option to launch the weapon immediately. When a Maverick AGM is assigned to a pylon the Launch Pylon>Wing Pylon X: AGM 65 option is greyed out until the target is within the missile's acquisition cone.

**Countermeasures:** Displays a submenu of available countermeasures. Select Flare or Chaff as needed to launch that countermeasure from any station. CMs are automatically reloaded until the supply is depleted. You can fire CMs even when Auto-Countermeasure crewman is ON.

**Sonobuoys:** Displays a submenu of available sonobuoys. Select the desired Buoy type and depth (Shallow = 90 feet; Deep = 400 feet.) The number of buoys remaining appears in parentheses after the buoy name. This menu launches all of the buoys in the external launchers first. When those have been depleted the internal buoys are launched. Internal buoys must be first loaded into a tube in the TACCO Sonobuoy Station. If the number of remaining buoys of any type is greater than zero but the option is greyed out, load out the three internal buoy tubes at the TACCO Sonobuoy Station with the desired type of buoy to once again enable the Sonobuoy option in the Orders or Ownship Menus.

**Sensors:** Displays a submenu of the P-3's sensors. Select an option to toggle its state. A checkmark indicates a sensor is ON. Select *Secure All* to turn off all sensors simultaneously.

**Bomb Bay:** Select Open or Close to set the Bomb Bay doors to the desired state. A check mark indicates the selected option.

## DAMAGE REPORT WINDOW

The Damage Report Window lists damage that occurs at any station. Some damage is repaired over time. When damage is repaired a message appears here. An audible voice message may also be heard. Each entry lists the time in the mission when the damage occurred, the type of damage and an estimate of time until the damage is repaired or an indication that the damage cannot be repaired. If damage is severe it cannot be repaired during the course of a mission.

⇒ Click the wrench button in the Task Bar to open/close the window.

## HISTORY WINDOW

The History Window displays the type of history selected by the History Selection buttons to the left of the window. The window scrolls as necessary, with the oldest history appearing at the top of the window.

**History Selection Buttons:** A lit button indicates the currently selected History type. If there is a new message in any other window, that window's selection button flashes until that button is selected.



- Crew Report History: Lists all orders as acknowledged by crewmembers.
- Radio Traffic History: Lists all radio messages received and the initial tasking message.
- Multiplayer Chat History: Displays a history of multiplayer chat messages.

## MANEUVER SHORTCUTS AND GAME READOUTS

Digits and buttons are orange by default. Selected buttons are yellow and maneuver shortcut digits change to yellow while changes are entered.

- ⇒ To change course, speed or altitude with a Maneuver Shortcut, click digits to enter the desired number. Click to increment a digit, right-click to decrease its value.

**ALT:** Shows/changes current altitude.

**WIND:** Displays the current wind speed in knots and direction in this format: Wind Speed...Direction (No user interaction.)

**SPEED:** Shows relative speed through the air in knots. Click digits to change OS speed.

**COURSE:** Shows/changes current course in degrees.

**TIME:** Displays the time of day in the mission based on a 24-hour clock. When the game is paused, the time display is replaced by the word PAUSED.

- ⇒ Press [P] to pause the game. Press [P] again to resume the game.
- ⇒ Click the numbers in the Time display to pause the game. Click PAUSED in the time display to restart the game.

## TIME COMPRESSION SCALE

In addition to real time, S.C.S. - *Dangerous Waters* supports four levels of time compression. The time scale displays in the far right of the Task Bar. A stack of colored bars represents the level of time compression.

- At real time, a single green bar is displayed.
- At twice real time a lime (yellow/green) bar appears above the green bar.
- At four times real time a yellow bar is added to the stack.
- At eight times real time an orange bar is added.
- At up to sixteen times real time (depending on system capability) a red bar appears at the top of the stack.

⇒ Press [.] (period) or [ , ] (comma) or click/right-click on the scale to toggle through all the time scales.

✓ **NOTE:** Time compression is not available in Multiplayer missions.

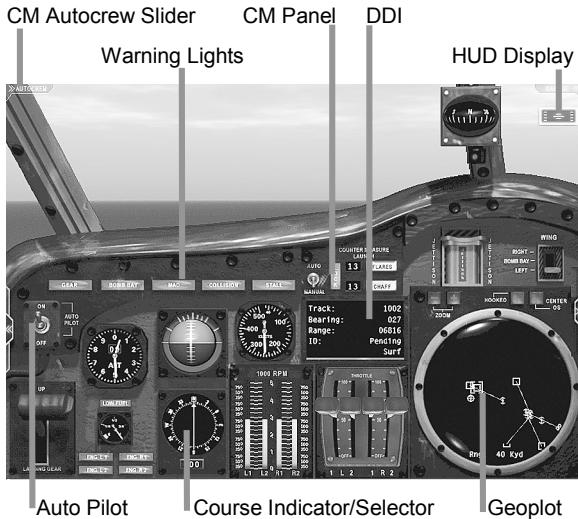
## P3-C PILOT STATION [F1]

From the Pilot Station the landing gear is raised and lowered, weapons are jettisoned, the course and speed of the aircraft are controlled and warning lights and fuel gauges are monitored. The location of Ownship in relation to other contacts is seen on the Geoplot and either Ownship or a hooked contact can be centered.

If so desired, the P-3C can be piloted with a joystick when in the Pilot Station with Auto Pilot OFF. See *Piloting the P-3C with a Joystick* later in this section. When using the joystick, two alternate views are available: Nose view and Tail view. These are accessed via the HUD Display button in the upper right of the pilot station or by pressing the [V] key.

### P-3C PILOT STATION FUNCTIONALITY

The P-3C Pilot Station is made up of the following areas. While the course, speed and altitude can be changed from any station via the Task Bar maneuvering shortcuts, course and speed can be adjusted using the Throttle and Course Indicator/Selector gauge.



**P-3C Pilot Station**

The Pilot Station is made up of the following areas:

**Auto Pilot Switch:** The Auto Pilot is not like other Autocrew in S.C.S. – *Dangerous Waters*. This option is not associated with the Pilot Station Autocrew slider button. (The Pilot Station slider is associated with the Countermeasure Autocrew.) The Auto Pilot turns on automatically when you leave the Pilot Station and is always on while you are at the Pilot

Station except when you are controlling the P-3C with a joystick. If no joystick is in use, setting Auto Pilot to OFF has no effect.

#### **Auto Pilot switch is ON:**

- When Auto Pilot is ON he follows course waypoints and maintains ordered speed and altitude. You can change ordered speed and altitude without canceling waypoint following.
- Changes in ordered course cancel his waypoint following, and enables the *Navigate>Follow Waypoints* option in the Orders and Ownship Menus. Select that option to order the Auto Pilot to resume following existing waypoints. (Auto Pilot must be ON for these options to function.)
- If there are no waypoints, he maintains ordered course, speed and altitude.
- The Auto Pilot terrain-follows at all times, attempting to maintain 100 ft above the surface (terrain or water).
- If the throttle is adjusted, the Auto Pilot may not be able to cope with unbalanced throttle settings.

#### **Auto Pilot switch is OFF:**

- The plane can be flown manually using a joystick. See *Piloting the P-3C with a Joystick* later in this section. Manually setting the switch to OFF has no effect until you also move the joystick.
- When switched back ON, Auto Pilot tries to maintain current course, speed, and level off at the current alt. If you have placed the plane in a steep dive or other extreme maneuver, turning the Auto Pilot back on may not be enough to save you.
- The Auto Pilot automatically switches to ON when a station other than the Pilot Station is selected. You must reset Auto Pilot to OFF each time you return to the Pilot Station to fly with the joystick.

**Warning Lights:** The following warning lights illuminate as indicated below.

**Gear:** Lit when landing gear is down.

**Bomb Bay:** Lit when Bomb Bay doors are open.

**MAD:** Lit when the Magnetic Anomaly Detector (MAD) senses a contact.

**Collision:** Lit when a collision with land or water is imminent. Change altitude.

**Stall:** Lit when an aircraft stall is imminent. Level out and increase speed.

**Landing Gear Lever:** Once the plane is airborne, the landing gear should be retracted. The Auto Pilot does not perform this duty.

⇒ Click on UP to raise the gear.

- ⇒ Click on LANDING GEAR to lower the gear for the landing sequence.

**Altimeter:** The Altimeter provides a visual representation of current and changing altitude. The digital readout indicates the altitude in thousands of feet. The longer hand indicates 100's of feet (one sweep of the dial represents 1000 feet). The shorter hand indicates 1000's of feet (one sweep of the dial represents 10,000 feet). The digits count off one unit per 1000 feet of vertical elevation. Clockwise movement indicates upward movement. Counterclockwise movement indicates downward movement.

**Fuel Gauge:** Indicates current level of fuel.

**Engine Warning Lights:** Lit when designated engine is damaged, stalling, or out of fuel.

**Horizon Indicator:** Provides the pilot with a visual indication of the aircraft's orientation relative to the horizon.

**Course Indicator/Selector:** The 12:00 position indicates the current course. The red arrow indicates the selected course.

- ⇒ Click on the desired heading to set the plane on that course.

**Speed Indicator:** The needle indicates the current speed in knots. Change speed with the throttles, the Task Bar maneuver shortcuts or Orders Menu commands. (Speed can also be changed with a joystick.)

**Engine RPM Indicators:** Each engine's revolutions per minute are shown in individual scales. The bottom of the scale (green) indicate lowest RPMs, the top (red) indicates high RPMs. These settings coincide with the position of the throttle.

**Countermeasure Launch Panel:** The following functions are possible in this area.

**CHAFF and FLARE Buttons:** A lit button indicates the countermeasure is ready to launch.

- ⇒ Click desired button to launch the indicated countermeasure. The button flashes until the tube is reloaded.

**Auto/Manual Switch:** When in AUTO mode, chaff and flares are automatically launched and evasive maneuvers initiated when a weapon is locked on Ownship. Countermeasures can still be launched manually when in Auto-mode.

- ⇒ Click on AUTO to place Countermeasures in auto-mode. (The Autocrew slider button in the upper left corner of the Pilot station also toggles the state of the switch.)

**LOCK Warning Light:** Lit when a weapon is locked on Ownship.

**DDI:** This Digital Data Indicator contains the following information about the platform track hooked on the Geoplot:

**Track:** Track number of selected track.

**Bearing:** True bearing of selected track.

**Range:** Range of contact from OS.

**ID:** Link or player designated alliance of the selected track.

**Class/Category:** Link or player designated class name or category of the selected track displays in the bottom row. Given the length of some class names, there is no label.

**Sonobuoy Information:** In addition to Track, Bearing and Range the following information displays when a sonobuoy is selected replacing the ID and Class lines in the DDI.

**Type:** Lists the type of buoy selected.

**Channel:** Lists the channel on which the buoy is transmitting. Set this channel number in the Acoustic Station to tune to this buoy's transmissions.

**Throttle:** Controls the Revolutions Per Minute for all four engines, thus increasing or decreasing the aircraft's speed. The RPM indicators to the left of the throttle provide a visual display of the current RPMs.

- ⇒ Click the levers and drag up to increase the RPMs of all engines.
- ⇒ Click the levers and drag down to decrease the RPMS.
- ⇒ Right-click and drag an individual throttle lever to change the RPMs for that engine only.

**Jettison Selector Switch:** Click the label indicating the location of the weapons to be jettisoned. (Right Wing, Left Wing or Bomb Bay.)

**Jettison Switch:** Click to jettison weapons in the location selected with the Jettison Selector Switch.

**HUD Display:** The Heads Up Display button provides access to the nose view and tail view, which are helpful when flying the plane with a joystick.

**Geoplot Controls:** These buttons, located above the circular Geoplot, control zoom and centering options.

**Zoom:** Click desired button to zoom in (+) or out (-) on the Geoplot.

**Hooked:** Click to center the hooked platform in the Geoplot.

**Center OS:** Click to center Ownship in the Geoplot.

**Geoplot:** Displays track symbols for detected contacts. The small circle attached to the Ownship symbol indicates the location a mine or torpedo will enter the water if dropped at the current time. Use the mouse wheel to zoom in and out on the Geoplot or use the buttons above.

## PILOTING THE P-3C WITH A JOYSTICK

The P-3C can be piloted with a joystick whenever the Pilot Station is selected. The joystick must be programmed to work with S.C.S. - *Dangerous Waters* prior to gameplay as described below.

## **Programming a Joystick for use with Aircraft**

1. Ensure that the joystick is attached to the computer. Follow the joystick manufacturer's instructions for installation of any software and for connecting the joystick to the computer.
2. From the Main Menu select OPTIONS.
3. Click CONTROLS.
4. Click AIR/HELO to select it. A check mark indicates the option is selected.
5. Double click a line option in the list then move the joystick control as desired to associate that movement with the selected option. Items with no keyboard commands are applicable a joystick only. There is no keyboard equivalent.
6. Continue until all listed options have been associated with a joystick movement.

## **Using a Joystick**

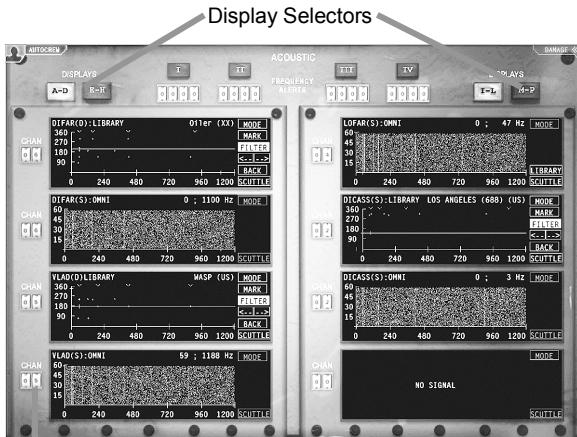
Keep in mind the following when flying an aircraft using a joystick.

- The joystick must first be programmed as described above to work with *S.C.S - Dangerous Waters*.
- The joystick is functional only in the Pilot Station.
- You must manually set the Auto Pilot switch to OFF then subsequently move the joystick. When the switch is clicked to the OFF position the Auto Pilot is still enabled until you move the joystick. If no joystick is installed, setting the Auto Pilot to OFF has no effect.
- The Auto Pilot turns on automatically when a station other than the Pilot Station is selected and maintains the last ordered course speed and altitude.
- Any existing waypoints are no longer followed once the Auto Pilot is OFF. To return to following the waypoints, Auto Pilot must be ON and *Navigate>Follow Waypoints* must be selected from either the Orders or Ownership Menu.
- Three views are available. Cockpit View, Nose View and Tail View. Click [V] repeatedly to cycle through the views or click the HUD button repeatedly in the upper right of the screen to change the view.

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## **P-3C ACOUSTIC STATION [F2]**

In its ASW role the P-3C deploys sonobuoys and processes their data to detect and localize subsurface contacts. Four sonobuoys modeled in *S.C.S - Dangerous Waters* are available for launch from the controllable P-3C. For information on the Sonobuoys modeled and detailed information on processing incoming data see *Training/Sonar School/Sonar Systems/Sonobuoys* and also *Sonobuoy Data Display Windows (Grams)*.



Channel Selector

A description of the P-3C's Acoustic station follows.

**Data Displays Windows (GRAMS):** Also called Grams, these windows display the sonobuoy data being transmitted on the selected channel. Data from up to sixteen buoys can be displayed using the lettered buttons above the displays. Buttons A-D and E-H control the data to be viewed in the four left-side Display Windows. Buttons I-L and M-P control the data to be viewed in the four right-side display windows.

- ⇒ Click the desired button and set the associated channels as desired.
- ⇒ Go to the Nav Map to determine on which channel a buoy is transmitting. The channel in use appears next to a buoy NTDS symbol on the Nav Map and appears in the DDI when a buoy symbol is selected. Assign the desired channel number to a Data Display Window by clicking (or right-clicking) on a thumb-wheel. The window displays the data returning on the selected channel.

**FREQUENCY ALERTS:** The Sonobuoy Processing System can be set to alert the user when a specified frequency is detected. Four alerts can be specified.

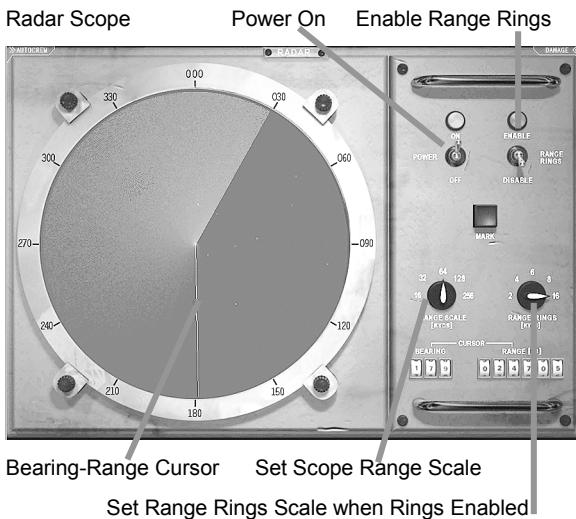
- ⇒ Click one of the four buttons labeled I – IV.
- ⇒ Click the individual digits on the thumb-wheel associated with a Frequency Alert button to designate the desired frequency of interest. When the specified frequency is detected, the button flashes and an audible alert is heard.

**CHAN:** Channel Selectors. Click or right-click the digits on the thumb-wheel to set the receiving channel for that display.

✓ **Note:** For Information on how to process and mark contacts in the sonobuoy Data Display Windows see *Training/Sonar School/Sonar Systems/Sonobuoy Data Display Windows (Grams)*.

## P-3C RADAR STATION [F3]

The Radar Station displays radar returns on surface and air contacts. Contacts marked on the Radar appear on the Nav Map at the detected range and bearing.



### MARKING CONTACTS ON THE RADAR SCOPE

To manually mark contacts, the Radar Autocrew must be OFF.

1. Click ON to power up the radar.
2. Click the desired Range Scale number to set switch to that position.
3. Click ENABLE to enable Range Rings on the scope if desired.
4. Click the desired number at the RANGE RINGS switch to set the range rings to that display on the Scope.
5. Contacts appear as small dots on the scope. If close to shore, contacts may get lost in the ground clutter. Click on a contact to center the circle portion of the Bearing-Range Cursor over the contact or click and drag the cursor to center it. Be aware that the user cannot move the cursor when the Autocrew is ON.
  - ❑ The bearing and range at the location of the cursor appear as a readout in the CURSOR thumb-wheels in the lower right of the console.

6. Click MARK. The contact appears on the Nav Map at the detected range and bearing.

---

## **P-3C MAD/ESM STATION [F4]**

This station is used for passive detection of submerged submarines with MAD/SAD detectors. The Electronic Support Measures (ESM) scope allows passive detection, marking and classification of surface and air contacts.

### **MAD/SAD**

Large metal objects like ships and in particular, submarines create disturbances in the earth's magnetic field and these disturbances or anomalies, can be detected from above. The data from the P-3's Magnetic Anomaly Detector (MAD) and Submarine Anomaly Detector (SAD) appear on a plot located on the right side of the MAD/ESM Console. Distortions detected by these sensors provide a strong indication that a submarine is in the area. The MAD/SAD plot on the right side of the MAD/ESM Console provides information only. There is no user interaction.

- ⇒ Click ON next to the POWER switch below the MAD/SAD plot.
- ❑ When the MAD/SAD Plot is activated, the pens draw down the centerline when no anomalies or submarines are detected.
- ❑ When the pens draw away from the centerline this is an indication that something is in the vicinity. A large deviation from the centerline indicates a strong signal. The strength of the signal is determined by range and size of the target.
- ❑ The Notify Button is lit and a verbal crew report is issued when detections occur. The contact is automatically marked and appears on the Nav Map. The sensor also detects and marks surface ships in the immediate area.

### **Using MAD/SAD Effectively**

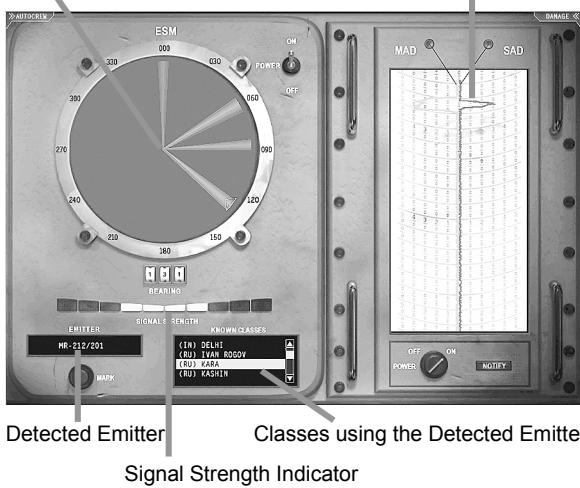
- ❑ The MAD sensor has an effective range of about 1000 yds. At altitudes above 1000 ft the sensor does not detect anything.
- ❑ At an altitude of 500 feet, the sensor detects underwater contacts in the 500 feet directly beneath the plane.
- ❑ The thermal layer does not mask a submarine from the MAD sensor. Going deep is a submarine's best defense against MAD and SAD.
- ❑ The SAD sensor is similar to the MAD sensor but has a more limited range of around 750 yards.
- ❑ SAD reports submerged contacts only.
  - ⇒ Patrol at a low altitude (200 feet if conditions permit) when searching with MAD/SAD sensors. Because of their short ranges, a spike indicates the plane is directly over the target.
  - ⇒ If the contact is known to be hostile, drop a torpedo immediately.

⇒ If the contact is unknown, launch buoys to further localize or identify the contact. When the contact is determined to be hostile, drop torpedoes.

## ESM

The ESM sensor detects radio and radar transmissions from other ships and aircraft. These detections display as orange wedges of varying size and intensity on the ESM Scope. The position of the wedge indicates the bearing on which the transmission is detected.

ESM Detections (Contacts)      ESM Cursor Mad/Sad Detection



**SIGNAL STRENGTH:** The light scale indicates the strength of the selected detection. The lights move from the center outward with the inner green lights indicating low signal strength. The outer red lights signal a strong signal. A strong signal usually indicates a contact at close range.

**EMITTER:** The name of the detected emitter for the contact selected in the ESM Scope. Once a contact is marked its track number appears in front of the emitter name.

**KNOWN CLASSES:** A list of ship and air classes known to use an emitter of the detected type appears here.

### To Mark a Contact at the ESM Console

1. Ensure that ESM Autocrew is OFF. The cursor cannot be moved when ESM Autocrew is on. Click the Autocrew slider in the upper left of the station to toggle the state of the Autocrew.
2. Click the power switch to the ON position.
3. Click the desired contact to select it. The position of the solid orange triangle cursor indicates the bearing of the contact.

4. Click MARK. The bearing information of the selected contact is sent to the Nav Map and a track number is assigned to the contact if another of Ownship's sensors has not already assigned a track number.
- Once a contact has been marked by one of Ownship's sensors, a track number appears in front of the emitter name in the Emitter field when the contact is selected in ESM.

### **Determining the Class of a Contact with ESM**

The ESM sensor provides the name of classes known to carry the detected type of emitter.

1. Click a contact in the ESM display. When a class name or a list of class names appears in the Known Classes window, click on a name in the list.
2. Scroll the list if necessary to find a contact that fits any other information you have on selected contact.
3. Select the desired Class name, then click MARK. The class name in the list is assigned to the contact track ID.
4. You still need to apply an alliance ID to the contact from the Contact Menu on the Nav Map. If you determine that the classification you have applied is in error, you can always change it from the Contact Menu's *Classify Contact* dialog.

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## **P-3C NAVIGATION STATION [F5]**

The Navigation Station functions identically from platform to platform. The basics of the Navigation Station are covered in the *Navigation Station* section of this manual. Some items on the Ownship Menu are unique to the P-3. These are described here.

### **OWNSHIP/ORDERS MENUS**

Click on the Ownship symbol on the Nav Map to select it then right-click on the selected symbol to display the Ownship Menu. The majority of the functionality contained in the Ownship Menu is also contained in the Orders Menu. See *P-3C Stations/P-3C Task Bar/P-3C Orders Menu* earlier in this section. The rest of the Ownship Options require the use of the Nav Map. These are the same from platform to platform. See *Navigation Station/2D Navigation Map/Ownship Menu*.

### **CONTACT MENU**

The Contact Menu appears whenever you select then right-click on a contact's NTDS symbol on the Nav Map. Most menu items are the same from platform to platform, however, there are several options that are unique to the P-3. The following Contact Menu options are available when you are commanding the P-3C in S.C.S. - *Dangerous Waters*.

### Engage With:

**Bomb Bay Pylon [X]:** [Weapon Name] Only torpedoes and mines can be loaded here.

**Pylon [X]:** [Weapon Name] Mines and missiles can be loaded here.

**Torpedoes and Mines:** When selected, a torpedo or mine is dropped with the default presets if you have not changed presets for the selected weapon at the TACCO station.

**AGM-65 Maverick Missiles:** (Available only for surface ship and land contacts.) The range of the AGM-65 Maverick Missile as modeled in S.C.S. – *Dangerous Waters* is 50 nm. The nose of the plane must be aimed at the target (within a 30 degree cone) and the plane must be within 50 nautical miles of the contact before this menu option is enabled.

**SLAM-ER:** (Available only for land targets.) A range of 155 nautical miles is modeled for the SLAM-ER in S.C.S. – *Dangerous Waters*. While waypoints can be assigned to the missile in the TACCO Station, when fired via the right-click Contact Menu, the missile flies on a straight course to the target. This option is only available from the Contact Menu when the target is within range of the missile.

## 2D NAV MAP LINES OF BEARING

In addition to the sonobuoy, Radar and ESM lines of bearing described in the *Navigation Station* section of this manual, the P-3C has an IR camera that can also be used to mark contacts. Contacts marked with the IR Camera appear at the actual range of the contact at the time it was marked at the end of a magenta line of bearing. The LOB helps differentiate between a visual contact marked by you and one marked automatically by the visual sensor. The latter has no LOB.

Because the P-3C has no TMA station you cannot determine and enter a firing solution for contacts with lines of bearing therefore the lines of bearing remain on the Nav Map for all sonobuoys and most contacts detected by Ownship sensors. The P-3C receives reports on visual contacts from the cockpit. These visual contacts appear at the designated range and all Link participants and the contacts they report appear on the Nav Map at the location reported by the Link participant. When updated regularly, these locations are fairly accurate.

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**Tip:** If you determine via buoy triangulation or other method the likely location of a subsurface contact, place a Manual Solution at the location of the suspected contacts, change the category and ID to Subsurface Hostile, then attack that contact with the *Engage With* command from the Nav Map or from the Geoplot on the TACCO Weapons Station. To place a Manual Solution, right click the Nav Map then select Add Manual Solution. This menu option does not appear when Show Truth is ON.

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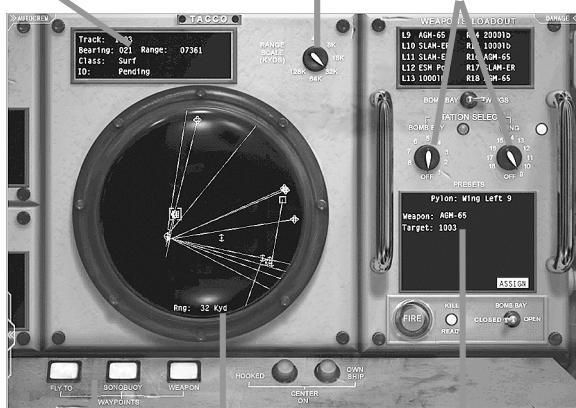
## P-3C TACCO [F6]

The P-3's Tactical Coordinator (TACCO) is responsible for launching sonobuoys and weapons. In *S.C.S. - Dangerous Waters* these tasks are accomplished from separate consoles at the TACCO Station. The Geoplot and Waypoint controls are available in both the Weapons Console and Sonobuoy Console views.

### TACCO WEAPONS CONTROL CONSOLE

The default view of the TACCO station is of the Weapons Control Console.

**DDI:** Geoplot Range Scale Selector Weapon Locations Selectors



Waypoint Controls Geoplot

Selected Weapon Presets

#### **P-3C TACCO Weapons Console**

The following areas make up the TACCO Weapons Console.

**DDI:** Digital Data Indicator. Displays information about the contact hooked on the Geoplot.

**Geoplot:** Displays the contact symbols for Ownship and all contacts reported by Ownship sensors and the Link when Show Link Data is turned on via the *Options >Game* menu or the Nav Map right-click menu. (See *Navigation Station*.)

**Range Scale:** Click to select the desired range in thousands of yards (kyds) visible in the Geoplot.

**WAYPOINTS:** Controls the placement of available types of waypoints.

**Fly-to:** Click to place a flight waypoint for Ownship on the Geoplot. A tiny F appears next to the square waypoint.

**Sonobuoy:** Click to place a buoy drop point on the Geoplot. The view is switched to the TACCO Sonobuoy Console and a buoy waypoint [B] appears on the Geoplot extending from Ownship. The buoy of the type

currently selected in the External Launch Tube Window is dropped. If you want a different type of buoy assigned to the waypoint, select a different type before you click the Sonobuoy button. You cannot change the buoy type once the waypoint is placed. You must delete the waypoint and place a new waypoint with the desired type.

**Weapon:** Click to place a weapon drop point for a torpedo or mine. The view is switched to the TACCO Weapons Control Console. A weapon waypoint appears on the Geoplot accompanied by a tiny [T]. A list of weapons available for assignment appears in the Presets window. You are prevented from selecting any other waypoint until you assign a weapon to the current waypoint.

- ✓ **Note:** When a weapon waypoint is placed the weapon assigned to the waypoint is automatically assigned the default presets and the default runout bearing of 000. To change the runout bearing, you must click ASSIGN to toggle the state of the Assign button, change the runout bearing or select a valid contact then click ASSIGN again.

**CENTER ON:** Click the desired button to center the associated symbol in the Geoplot: Ownship or a hooked contact.

**WEAPONS LOADOUT:** This window displays the name and pylon number of weapons located in the Bomb Bay or Wing pylons. The location to be displayed is selected by the toggle switch below the window.

**STATION SELECT:** Click a specific number in either the Bomb Bay or a wing location to see the presets for the weapon loaded at that location.

- ✓ **Note:** Wing Pylon 12 always loads the ESM Pod so no presets are visible when that number is selected.

**PRESETS:** This window displays the presets for the weapon selected in the STATION SELECT switch above the window. For information on these Presets, see *in P-3C Stations/P-3C TACCO Station/P-3C Weapons Presets* later in this section.

**FIRE:** Click to fire the selected weapon once presets are entered and applied. This button is not enabled unless the KILL READY button is illuminated.

**KILL READY:** This light illuminates when the selected weapon is ready to launch. If the weapon is in the Bomb Bay, the Bomb Bay doors must be open before this light is lit. The Maverick missile must be assigned to a target and the target must be within the acquisition cone before this light is illuminated.

**BOMB BAY:** Click OPEN or CLOSED to set the Bomb Bay orders to the desired position. Bomb Bay weapons assigned to a weapon waypoint (drop point) will not deploy unless the doors are open.

## Dropping a Torpedo

A torpedo can be assigned to run at a specific bearing once it enters the water or to a head for a specific surface or subsurface contact. Torpedoes can only be loaded out in the Bomb Bay in S.C.S. – *Dangerous Waters*.

### To Assign a Torpedo to a Runout Bearing:

1. Click the Geoplot to deselect all contacts. (If an invalid contact or a contact with a line of bearing (LOB) is selected, the Runout Brg label also appears. See Note below.)
2. Click the toggle switch under the WEAPONS LOADOUT window to the BOMB BAY position. Determine the pylon location for the torpedo you want to drop.
3. In the STATION SELECT area click the number of the Bomb Bay location containing the desired torpedo. If the Bomb Bay doors are open you are alerted if a weapon in a lower pylon blocks the selected weapon. Select the even numbered (lower) pylons first. The presets for the weapon appear in the PRESETS window.
4. In the **Runout Brg** field click/right-click digits to enter the bearing for the weapon to follow after it enters the water.
5. Click ASSIGN. (The ASSIGN button is solidly lit with black letters when ON.) This assigns the weapon to the bearing and presets entered. The system remembers the assignment even if you select a different pylon. To change the presets after you have assigned them, click ASSIGN again to unassign it, change the presets as desired, then click ASSIGN again.
6. If the Bomb Bay doors are open and the pylon is not blocked by another weapon, the green KILL READY light is lit and the FIRE button is enabled. Click FIRE to drop the torpedo.

### To Assign a Torpedo to a Specific Contact

1. Select a valid contact in the Geoplot (surface ship or submarine symbol). (Follow steps 2 and 3 above to select the location of the desired weapon.)
2. The **Target** label appears in the Presets area followed by the track number of the selected contact.

✓ **Note:** You cannot assign a torpedo to an invalid target (Ownship, air, land or sonobuoy symbol, or the symbol for unknown). When such a contact is selected in the Geoplot, **Runout Brg** replaces **Target** in the preset list, showing a default bearing of 000. Change the bearing as desired or select a valid target. (Once you have entered a bearing for a weapon on a given pylon, the system remembers that bearing for that pylon until you change it again.) If you are fairly sure that you know where a subsurface contact is located based on a sonobuoy returns, place a manual solution on the Nav Map and designate it as

the assumed category (surface, subsurface.) You are able to select the solution and assign a torpedo to the solution.

3. Click ASSIGN. The ASSIGN button is solidly lit (green with black letters) when ON. This assigns the weapon to the selected target with the presets as entered. The system remembers the assignment even if you select a different pylon. (To change the assigned target after it has been assigned, click the enabled ASSIGN button to deselect it, click a different target in the Geoplot and click ASSIGN again.)
4. Adjust the presets as desired. See *P-3C Stations/P-3C TACCO Station/P-3C Weapons Presets*. (With the exception of the Runout Brg, presets are greyed and cannot be changed if TACCO Autocrew is ON.)
5. Click OPEN next to the BOMB BAY toggle switch below the Presets. The bomb bay doors must be open before the KILL READY light is enabled. If a weapon in the lower pylon blocks the selected weapon, the green KILL READY light does not enable.
6. When the KILL READY light is green, click the FIRE button. The small circle extending in front of the P-3C symbol on the Geoplot indicates the approximate location where the torpedo will hit the water if the weapon is dropped at the current time.

**Tip:** The default Run to Enable (RTE) for torpedoes in the P-3 is set to 0. This means that the weapon begins its search pattern as soon as it hits the water. The snake search pattern is centered on the bearing entered or the target selected, however, if the weapon detects a contact while it is turning to center on a specific bearing or target, it will home on the first contact it detects. To give the weapon a chance to center on a specific bearing or target before it enables, set the RTE to at least 500 yards.

### **Dropping a Mine**

Mines can be loaded on the wings as well as in the bomb bay.

1. In the STATION SELECT area click the number of the pylon location of the desired mine.
2. The presets for the mine appear in the PRESETS window.
3. Click the text in the Depth field to set the depth for the mine. See *P-3C Stations/P-3C TACCO Station/P-3C Weapons Presets* for more information on mine depths.
4. If the mine is located in the bomb bay, click the BOMB BAY switch to OPEN.
5. When the KILL READY light is illuminated, click FIRE. The small circle extending in front of the P-3C symbol on the Geoplot indicates the approximate location where the mine will hit the water if the weapon is dropped at the current time.

**Tip:** While you are not prevented from assigning a weapon to a valid target that is attached to a line of bearing, be aware that in most cases the symbol at the end of the LOB is at a default range, not the location of the actual

contact. (Contacts marked with the IR Camera appear at the actual range of the contact is marked.) If you want to target a contact on a line of bearing, maneuver to send the torpedo down the line of bearing, not across it.

## **Launching an AGM-65 Maverick**

The Maverick is used to target surface ships and land targets. As modeled in S.C.S. - *Dangerous Waters* the desired target must be a contact designated as surface or land, within the confines of the acquisition cone in front of Ownship before the missile can be fired.

1. Select a wing pylon containing an AGM-65 Maverick. A cone appears in front of the Ownship symbol on the Geoplot. The only preset is the ASSIGN button.
2. The legs of the cone extend 50 nautical miles, the maximum range of the weapon.
3. Maneuver OS until the surface contact appears within the confines of the cone. When a valid contact is within the cone, (surface or land) select that valid contact in the Geoplot and click ASSIGN. The KILL READY light enables enabling the FIRE button. If the assigned contact moves out of the acquisition cone before missile is fired, the KILL READY button is disabled and the missile cannot be fired. You can assign the contact to the missile before the contact is in the cone. When the contact enters the cone, the KILL READY and FIRE button are enabled.
  - ❑ If an invalid contact is selected, the ASSIGN button is greyed out. Invalid contacts are air and missile symbols, sonobuoy symbols and your OS base airport. See the **TIP** above concerning the advisability of firing at targets attached to a Line of Bearing.
  - ❑ If a different contact is selected after the missile has been assigned to a contact the assignment stays with the original contact. Un-assign the contact by clicking the ASSIGN button, then ensure that the desired contact is selected and click ASSIGN again. (ASSIGN is ON when the button is green with black letters.)

✓ **Note:** The Nav Map Contact Menu's *Engage With >Maverick* option only enables if the selected contact has a surface ship or land contact symbol and the contact is currently within the detection cone of the missile. The cone legs only appear in the TACCO Geoplot, not on the Nav Map. If the option is available, the target is within the cone. The *Engage With* command overrides any pylon assignment made at the TACCO station.

## **Launching a SLAM-ER**

In S.C.S. - *Dangerous Waters* A Standoff Land Attack Missile – Expanded Response (SLAM-ER) can only be assigned to a land target from either the TACCO Station or the Nav Map. When the missile is assigned to a land target in the TACCO Station, the last weapon waypoint is affixed to the target symbol. Waypoints cannot be affixed to ships and planes. A land

target appears in the Geoplot as an X. The SLAM-ER has a maximum range of 155 nm in S.C.S. – *Dangerous Waters*. Make sure that the course placed with waypoints does not exceed 155 nautical miles.

1. Zoom out as far as possible to see the location of the X on the Geoplot. The Geoplot has maximum range of 128 kyds (63 nm) when zoomed out. The missile can strike targets not visible in the Geoplot when Ownship is visible.
2. If the desired target is not visible, center the view on Ownship in the Geoplot, go to the Nav Map to determine the location of Ownship relative to the Land Target (X), then return to the Geoplot and click and drag the view in the direction of the target until you can see the X.

**TIP:** To check if the desired target is within range of the missile, check the range to the target on the Nav Map. Right-click on the target then select *Engage With* from the Contact Menu. If the SLAM-ER option is not greyed out, the target is within the 155 nautical mile range of the missile. If the SLAM-ER is greyed out in the *Engage With* menu, the contact is out of range. The *Engage With* option assumes a straight-line flight path and assumes the current location of OS, which changes quickly given your speed. Be aware that while the contact may be in range given a straight flight path, it may be out of range if waypoints are dragged to increase the flight path at the TACCO Station. You are not prevented from assigning the missile to a contact that is out of range from the TACCO Station.

3. Click on the X in the TACCO Geoplot to select it.
4. Select a WING location containing a SLAM-ER missile by clicking on the STATION SELECT dial. Waypoints extend from the P-3C ending at the location of the land target.
5. If no land target is selected when a SLAM-ER is selected in the STATION SELECT dial, a set of three waypoints extends from the missile to a default range directly in front of OS. Click on a land target and the final waypoint jumps to the selected land target. Adjust the waypoints as desired. See Note below.
6. The KILL READY light is always lit. Click FIRE to launch the missile.

### **Assigning a Torpedo Waypoint**

Only torpedoes and mines can be assigned to a P-3C weapon drop waypoint. The OS symbol must be selected to see waypoints. A torpedo dropped at a waypoint can be assigned to a specific bearing or a selected contact.

### **Waypoint for a Torpedo Assigned a Specific Bearing**

1. Click the Geoplot to deselect any contact. Click the WEAPON button in the WAYPOINTS area below the Geoplot. The names of all the weapons available for waypoint assignment appear in the PRESETS Window.
2. Click on a weapon name/location in the list to reveal its preset panel.

3. The **Runout Brg** field appears in the Presets area showing the default bearing of 000. The ASSIGN button is already activated. You must click the activated ASSIGN button to de-activate it if you want to set the runout bearing to anything other than the default 000. Be sure to click ASSIGN again to enter your presets into the system. If the bomb bay doors are open the KILL READY light is lit and the weapon will drop when the waypoint is reached.

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TIP: Click the OS symbol then press [R] and drag the cursor toward the target. A readout of the range (R) and bearing (B) to the contact appear near the bottom of the Geoplot. Use those numbers to help determine the Runout Bearing for the torpedo and the desired Run to Enable.

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### Waypoint for a Torpedo Assigned a Specific Target

1. Click a valid torpedo target (surface ship or submarine symbol) to select it in the Geoplot then click the WEAPON waypoint button.
2. Click on a weapon name/location in the list to reveal its preset panel.
3. The **Target** field appears in the Presets panel followed by the track number of the selected contact. The ASSIGN Button is already activated and if the Bomb Bay doors are open, the KILL READY light is illuminated. The torpedo is ready to drop at the designated waypoint location.

- ✓ **Note:** When the waypoint button is clicked you are prevented from moving any other waypoints until you select a weapon assignment for the new waypoint. WAITING Appears in the DDI when the waypoint is selected. If you select a different wing location or a different station before assigning a weapon to the waypoint, the waypoint is deleted.

### Positioning, Adding and Deleting Waypoints

- ⇒ Click and drag a waypoint to move it to the desired location but be aware that Ownship may not be able to reach the waypoint if it is placed too close to OS or behind OS such that OS cannot maneuver to the desired position before the waypoint location is reached.
- ⇒ Click a specific Waypoint to add a waypoint immediately after the selected waypoint.
- ⇒ Click a valid contact or the OS symbol to insert a waypoint directly after Ownship.
- ⇒ If no symbol is selected when a waypoint is inserted, the waypoint is added immediately after the OS Symbol.
- ⇒ If waypoints have been assigned and you have ordered OS on a different course before adding additional weapon (or sonobuoy) waypoints, you must reassign OS to follow the waypoints using the *Navigate>Follow Waypoints* command in the Ownship or Orders Menu.

- ⇒ To delete a weapon waypoint, select the waypoint on the Geoplot and press [Delete]. Select the Ownship symbol on the Nav Map then right-click on it to display the Ownship Menu. Select *Navigate>Remove Waypoints* to remove ALL waypoints regardless of type.
- If the waypoint is deleted for any reason, any presets that were changed remain attached to the weapon. Any assigned target is replaced with Runout BRG 000.
- If no weapon is assigned when the waypoint is reached, the waypoint is treated as a fly-to waypoint. No weapon is assigned so no weapon is dropped.

### **Assigning a Mine Waypoint**

Mines are not assigned to a bearing or target. It makes no difference if a contact is selected.

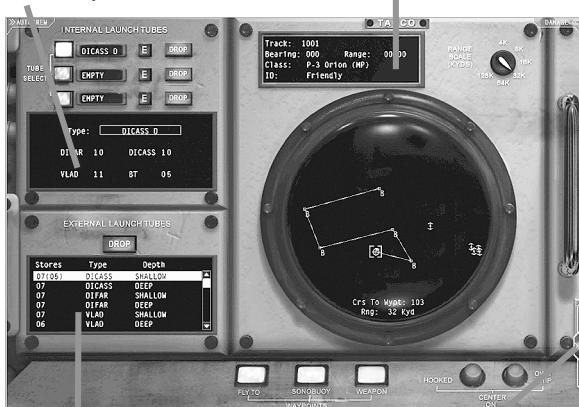
1. Click WEAPON in the Waypoint area.
2. Select a Mine from the list of available weapon assignments The Weapon Presets appear.
3. Select the desired depth for the Mine. If the Bomb Bay doors are open, the KILL READY light is lit and the mine will drop when the waypoint is reached.

**Tip:** The Bomb Bay doors must be open before a Bomb Bay weapon can be dropped at a waypoint. If the KILL READY light is not green, check to be sure the Bomb Bay Doors are open. Also ensure the ASSIGN button is activated.

### **TACCO SONOBUOY CONSOLE**

The TACCO Sonobuoy Console is reached by clicking the Transition Button in the lower left of the TACCO Weapons Console.

## Sonobuoy Selection Window DDI



External Sonobuoy Selection Window

Transition to Weapons Console

## P-3C TACCO Weapons Console

The Sonobuoy Console is made up of two areas used to launch internally loaded sonobuoys and the external buoys that were loaded prior to game start.

### Internal Launch Tubes

Internal tubes can be reloaded as long as stores remain.

**TUBE SELECT Buttons:** Click a button to select a sonobuoy tube to load. To change the buoy loaded in the selected tube or load an empty tube, click the text in the TYPE field in the Sonobuoy Selection Window to cycle through available sonobuoys. The text in the Type field flashes until the buoy is loaded.

**E Buttons:** Click to equalize the pressure in the cabin prior to launching sonobuoy. Once equalized, the drop button is enabled and the buoy type cannot be changed. Click E again if you want to change the buoy loaded.

**DROP buttons:** Click an illuminated button to drop the designated buoy. The tube must be equalized before the DROP button illuminates.

### Sonobuoy Selection Window and Stores Readout

Directly below the TUBE SELECT buttons is the Sonobuoy Selection Window. The Window consists of these areas.

**TYPE:** Click inside the TYPE field to cycle through the available types of sonobuoys. The buoy name showing in the TYPE field is loaded in

the selected tube in the TUBE SELECT area in the Internal Launch Tube window.

**Stores Area:** The area below the TYPE field displays a running inventory of available sonobuoy stores.

### To Launch An Internal Sonobuoy

1. Click one of the three white TUBE SELECT buttons to select it. The buoy named there is currently loaded in the tube.
2. Click in the TYPE field below the buttons to select the type of buoy to load in the selected tube. Continue to click until the desired buoy name appears in the field. (The text in the selected tubes buoy field flashes until the buoy is loaded.)
3. Click E to equalize the tube. (The tube need not be selected to equalize.) Once equalized, the DROP button is enabled.
4. Click DROP as desired to drop the buoy.

✓ **Note:** Buoys are preset to: Deep (400 ft) or Shallow (90 Feet).

### External Launch Tube

The buoys in these tubes were loaded prior to game start in the Weapons Loadout Screen and cannot be reloaded during flight.

**DROP:** Click to drop a sonobuoy of the type selected in the External Sonobuoy Selection Window.

**External Sonobuoy Selection Window:** This window contains a list of the sonobuoys currently available.

**Stores:** Displays the number of buoys of that type remaining. Any number in parentheses following the stores number indicates the number of buoys of this type currently assigned to a buoy waypoint.

**Type:** Displays buoy name.

**Depth:** Displays the default depth for the buoy, either Deep (400 ft) or Shallow (90 Feet).

### To Launch a buoy from an External Tube

1. Click a buoy name and its specified depth to select it.
2. Click DROP. The count is updated in the Stores column.

✓ **Note:** When Sonobuoys are selected for launch from the Ownship or Orders Menu's *Sonobuoy* option, they are dropped from the external launchers first, then the Internal launchers. Text in a right-click menu *Sonobuoy* option is greyed if all external buoys are launched and no buoy is loaded in an internal launcher.

### Assigning a Sonobuoy Waypoint

To create a drop point where an assigned type of buoy drops automatically, follow these steps.

1. From the TACCO Sonobuoy Console, click the name of the desired type of buoy from the External Launch Tube Window.
2. Click the SONOBUOY button in the WAYPOINTS area below the Geoplot. A buoy waypoint/drop point (marked by a tiny B) appears on the Geoplot at the end of a line extending from the OS symbol. The line indicates the flight path to the buoy drop location.
  - ❑ The number of buoys of each type currently assigned to buoy waypoints appears in parentheses after the number of buoys currently onboard. As each buoy is dropped, the number updates to reflect the current loadout and current buoy assignments.
  - ❑ If all of the buoys of a particular type are currently assigned to waypoints, no more waypoints of that type can be assigned. Be aware that the button can still be clicked but no buoy is assigned. Select a different type of buoy.
3. Click on the waypoint and drag it to the desired location. You may need to zoom in to see it.
4. You cannot change the type of buoy assigned to a drop point once it has been entered. You must delete the buoy waypoint and insert a new one with the correct type of buoy assigned. (Click the waypoint to select it, and then press [Delete] to delete the waypoint.)
5. To add a waypoint between OS and the waypoint, select the OS symbol on the Geoplot and click SONOBUOY.
6. To add a drop point after the last drop point, select the last drop point and click SONOBUOY. The type of buoy to be dropped at a specific waypoint appears in the DDI when the waypoint is selected in the Geoplot.

✓ **Note:** If you are in the TACCO Weapons Console when you click the SONOBUOY button, the view automatically switches to the TACCO Sonobuoy Console and whatever sonobuoy is currently selected in the External Launch Tube window is assigned to the waypoint.

## P-3C WEAPON PRESETS

The presets for the weapons carried by the P-3C in S.C.S. – *Dangerous Waters* are described below by type of weapon.

### Torpedoes

#### MK 46 and Mk 50

These are lightweight torpedoes primarily used for subsurface targets.

**Mk 46:** Maximum range of 6 nm (12,000 yards); maximum speed of 45 knots; maximum depth of 1500 feet (457 meters).

**Mk 50:** Maximum range of 7 nm (14,177 yards); maximum speed of 55 knots; maximum depth of 3,600 feet (1,100 meters).

Both torpedoes have the following presets:

**Weapon:** Lists the weapon loaded on the selected pylon.

**Runout Brg/Target:** The label that appears depends on what is selected (or not selected) in the Geoplot.

**Runout Brg:** This label appears if no contact, an invalid contact or a contact attached to a line of bearing is selected in the Geoplot. Click/right-click the digits to enter the desired bearing for the torpedo to head once it hits the water. Then click ASSIGN to assign the weapon to that bearing.

**Target:** If a contact is selected in the Geoplot, its track number appears here. Click ASSIGN to assign the weapon to the selected target. When dropped the torpedo heads on the bearing to the assigned target. Set other presets as desired. If TACCO Autocrew is on he sets these presets and you are prevented from making changes.

**RTE: (Run to Enable):** Sets the distance (in yards) at which the torpedo enables and begins its search.

- The maximum range of the Mk 46 (as modeled) is 12,152 yards.
- The maximum range of the Mk 50 (as modeled) is 14,177 yards.

**Depth:** Set the depth (in feet) at which the weapon travels.

**Speed:** Set the speed (in knots) at which the weapon travels

**Ceiling:** Set the depth (in feet) above which the weapon does not travel.

**Floor:** Set the depth (in feet) below which the weapon does not travel.

**Search:** Set the search options for the weapon as seen below.

**Active/Passive:** Click to toggle between these two sonar mode options.

**Snake/Circle:** Click to toggle between these two search pattern options.

**ASSIGN:** Click to assign the selected weapon to the selected target or bearing. You can then change the presets as desired but the weapon remembers what target or bearing was assigned and targets that location when dropped. Click ASSIGN again to remove the assignment.

- When enabled, the ASSIGN button is solid green with black letters. Click the button to toggle its state.

**Depth:** Set the depth (in feet) at which the weapon travels.

## Mines

### 1000 lb, 2000 lb

As modeled in *S.C.S. – Dangerous Waters* these mines can be set for the following depths.

**Surface:** Sets Mine depth to just below the surface.

**Shallow:** Sets Mine depth to 25 meters (~82 feet)

**Deep:** Sets Mine Depth to 133 Meters (~436 feet)

**Bottom:** Sets mine to rest on the sea bottom.

## Missiles

### SLAM-ER (Stand Off Land Attack Missile- Expanded Response)

As modeled in *S.C.S. – Dangerous Waters* the SLAM-ER can be assigned to land targets only. Three waypoints are provided for the weapon to follow in the TACCO Geoplot and defined in the Presets area. If the exact coordinates of the target are known, enter them directly into the bottom DESTRUCT field. (Otherwise click and drag a waypoint to move it to the desired location.)

**Fly to (Lat/Lon):** There are two flight path waypoints. Click on each of them and drag them to the desired location. The numbers in the Lat/Lon fields update to reflect the current longitude and latitude of the selected waypoint.

**Destruct (Lat/Lon):** The last waypoint represents the target location. If the missile misses the target it will destruct shortly after it passes this location.

### AGM-65 Maverick

The AGM-65 Maverick is an IR-guided missile. As modeled in *S.C.S. – Dangerous Waters* the AGM-65 Maverick can attack surface and land contacts within a 30-degree cone fifty miles ahead of Ownship. The missile has only one preset.

**ASSIGN:** Select a valid contact in the detection cone then click ASSIGN. The KILL READY light illuminates to indicate missile lock-on. If the target moves out of the detection cone prior to missile launch, the KILL READY light is disabled. ASSIGN is solid green with black letters when it is activated. You can assign a target to the missile when it is not in the cone and when it enters the cone, the KILL READY light illuminates and the weapon can be fired.

## P-3C INFRARED CAMERA [F7]

The Infrared camera is used to mark contacts and to fulfill goals requiring photographing specific targets. The camera views provide excellent views of the battle space under the aircraft.



**P-3C Infrared Camera Station**

**CAMERA TURRET CONTROL:** Camera is retracted by default.

Click EXTEND to move the switch to the lowered position. The camera must be turned on once it is extended.

**CAMERA CONTROL:** The camera defaults to OFF. Once the camera is extended, switch the camera to one of the following modes to enable the camera.

**LLTV:** Click to select Low-Light Level TV for night use.

**NORMAL:** Click to select the camera view with no filtering.

**INFRARED:** Click to select Infrared Mode.

**GREYSCALE:** Click to select a greyscale view.

**POS CONTROL:** This area contains camera controls and provides camera position information.

**Quick POS:** Click FWD (Forward) to quickly move the camera to view the area directly in front of the plane. Click REV to quickly position the camera to view the area directly behind the plane. (To view the other side of the plane on the return pan, click and drag in the camera view to move the cursor to the other side of 0 or 180/-180 then click FWD or REV as desired.)

**AUTO TRACK:** Click to quickly pan to and lock the camera on the track number selected in the TRACKS List. When Auto Track is ON you cannot click and drag the view.

**TRACKS:** Lists tracks detected by Ownship sensors and Link participants.

**ZOOM:** Controls the camera zoom. Click + to zoom in and – to zoom out.

**CAM: TRUE BEARING/AZIMUTH:** The true bearing and azimuth of the current camera view.

**IMAGING:** This area contains controls for processing contacts.

**PHOTO:** Click to complete any photography goals. Photos are not available to the player but button click is logged to determine goal completion for missions where reconnaissance photos are a requirement.

**MARK:** Click to mark the contact that appears in the reticule. The contact information is sent to the Nav Map and appears at the end of a magenta colored Line of Bearing at the range and bearing at the moment it was marked.

---

## P-3C AUTOCREW

Below is a recap of all P-3C Autocrew functionality. Remember that your Autocrew is not 100% infallible. Some crewmen are better than others and in some cases you may be better at a task than he is. In some stations the Autocrew does everything for you. At other stations you still have tasks to perform even when the Autocrew is on. These are noted below.

- ⇒ Click the AUTOCREW slider button in the upper left corner of a station to activate the Autocrew for that station. (Not all stations have an Autocrew function.) The Autocrew is ON when the crew silhouette is visible. Click again to toggle the state of that Autocrew.

## ACOUSTIC AUTOCREW

The P-3's Acoustic Autocrew sets hot buoys to Directional mode and marks contacts. He can only mark contacts in Directional Mode. If you change a channel, he may change it back. Acoustic Autocrew also classifies contacts using the Acoustic Profile Library but he is not speedy.

**Your Task:** You must set DICASS buoys to ACTIVE mode and mark active contacts yourself. You may need to turn Autocrew OFF to complete this task.

## AUTO PILOT

This option is not the same as other Autocrew functions. There is no Autocrew slider associated with this function. Auto Pilot can be turned OFF only at the Pilot Station. Once set to OFF, the Auto Pilot continues to function until you move the joystick. The Auto Pilot is always ON when you are not at the Pilot Station. Auto Pilot keeps the plane aloft and follows your

last orders or waypoints while you attend to tasks at other stations. When you fly the P-3C with a joystick you must reset Auto Pilot to OFF each time you enter the Pilot Station. If no joystick is in use, manually setting Auto Pilot to OFF has no effect. See *P-3C Stations/P-3C Pilot Station/Piloting the P-3C With a Joystick*. For a full listing of Auto Pilot functionality see *P-3C Stations/P-3C Pilot Station/P-3C Pilot Station Functionality* then *Auto Pilot Switch*.

## COUNTERMEASURE AUTOCREW

When ON the Countermeasure Autocrew launches chaff and flares and takes evasive maneuvers when a missile is locked on Ownship. This Autocrew function is set in the Pilot Station.

In addition to the Autocrew slider, you can also activate this function at the Pilot Station by setting the toggle switch to AUTO in the Countermeasure Launch Panel. You can change the setting from any station by selecting *Auto-Countermeasures* from the Orders Menu's Autocrew option in the Task Bar.

**Your Task:** You can still launch CMs and maneuver the aircraft when this Autocrew is on. If the Autocrew has taken evasive maneuvers when waypoints are assigned, you must select *Navigate>Follow Waypoints* from the Orders or Ownship Menus to reassign OS to the designated waypoints.

## ESM AUTOCREW

The ESM Autocrew marks contacts detected by the ESM sensor but does not classify them.

**Your Task:** You are prevented from doing anything in the ESM station when the ESM Autocrew is on. You must turn ESM Autocrew off to perform any tasks in the ESM station. It is your task to classify contacts by identifying the probable class of the contact from the list of classes known to carry the detected emitter. See *P-3C Stations/MADP-3C ESM Station/ESM* for information on classifying contacts in the ESM Display.

## RADAR AUTO CREW

When ON, the Autocrew marks all contacts and continually updates the contacts as long as the radar is on. The cursor cannot be manipulated manually when the Radar Autocrew is on.

**Your Task:** The cursor cannot be manipulated manually and the Mark button is disabled when the Radar Autocrew is on. If you want to mark contacts yourself you must turn the Autocrew OFF. (Use the Autocrew slider or the Orders Menu's *Autocrew* option.)

## TACCO AUTOCREW

When ON, TACCO Autocrew assigns torpedo presets appropriate for a track you select in the Geoplot and ASSIGN to a torpedo in the Presets area. All torpedo presets with the exception of the Runout Brg/Target field and the ASSIGN button are greyed.

**Your Task:** When the TACCO Autocrew is on, the weapon is automatically assigned the default presets. You must change the Runout bearing and click ASSIGN to assign the Presets to the weapon.

When a waypoint is assigned while TACCO Autocrew is ON, the default presets are already assigned to the weapon. To change the default Presets and/or the default runout bearing, click the green ASSIGN button to toggle the state of the button. Click/right-click the digits in the Runout Brg field to set the desired bearing or select a valid contact on the Geoplot then click ASSIGN again. TACCO Autocrew sets all presets when a torpedo is assigned to a specific target. The Autocrew makes no inputs for missiles or mines. You must make all target selections and enter presets for missiles. If the selected contact is beyond the range of the weapon, the Run to Enable is set to the maximum range of the weapon and the RTE digits do not update as you fly.



# *SECTION 10*

# *KILO STATIONS*



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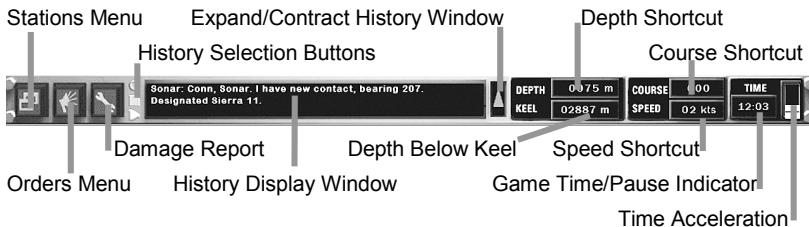
## 10: KILO STATIONS

All Kilos regardless of country or version have the same stations and station functionality in S.C.S. - *Dangerous Waters*. The Kilos differ in noise generation and in weapons loadout. All Kilos regardless of class (877 or 636) are referred to as Kilos in this manual.

- ✓ **Note:** The default view when entering a mission is the Navigation Station. The Navigation Station with its 2D Nav Map and 3D view functions the same on every controllable platform and is covered only once in the manual. See *Navigation Station*. Some Nav Station information unique to the Kilo is contained in the abbreviated *Kilo Navigation Station* section later in this section.

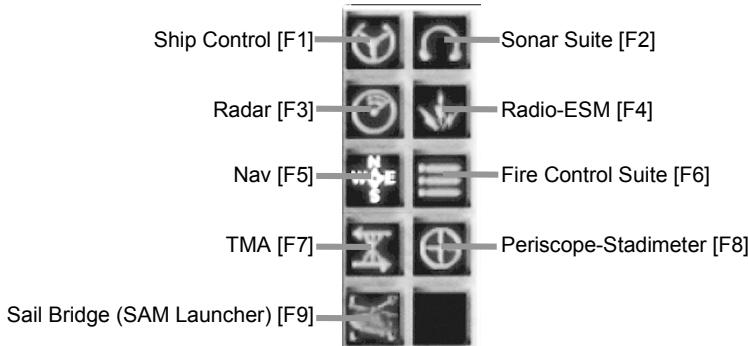
### KILO TASK BAR

The Task Bar for all submarines functions the same. Differences are cosmetic. The Kilo Task Bar appears below.



### KILO STATIONS MENU

Click the Stations Menu button to expand the selection menu. Select an icon to jump to that station.



## KILO ORDERS MENU

**Navigate:** Select various navigation orders. While most are self-explanatory a few require further information as seen below:

**Set Depth:** Displays the following submenu.

**Go to PD:** Orders Ownship (OS) to Periscope Depth (19 meters)

**Go Shallow:** Orders your ship to 29 meters.

**Go Deep:** Orders your ship to 254 meters.

**Go to Snorkel Depth:** Orders a depth of 17 meters

**Change Speed:** Displays a submenu of engine order shortcuts. Given no strong currents in the area, selecting one of the following commands results in the indicated speed if OS is submerged and running on the on battery:

**All Ahead Flank:** Maximum submerged (battery) speed for the platform (Kilo 877:17 knots; Improved Kilo 636: 20 knots.)

**All Ahead Full:** 17 knots

**Ahead Standard:** 15 knots.

**Ahead 2/3:** 10 knots.

**Ahead 1/3:** 5 knots.

**All Stop:** Orders OD to a full stop.

**Back 1/3:** 4 knots in reverse.

**Back 2/3:** 8 knots in reverse.

**All Back Full:** O 12 knots in a reverse

**All Back Emergency:** 16 knots in reverse.

- ✓ **Note:** Ordered speeds are lower if surfaced and using the diesels to charge the battery.

**Masts and Antennas:** Raise masts individually or lower all at once. Raising the masts while submerged can damage them if OS speed exceeds 8-10 knots. See *Appendix C: Submarine Max & Mins* for information on safe speeds for extending each mast while submerged. The Snorkel Mast option is only available when at snorkel depth (17 meters) or shallower.

**Diesel:** When the snorkel mast is raised these options are enabled. These turn off automatically if the sub exceeds snorkel depth.

**Port Engine Start** (or Off): Select to start (or shut down) the port diesel engine.

**Starboard Engine Start** (or Off): Select to start (or shut down) the starboard diesel engine.

**Autocrew:** Displays a submenu of Autocrew options. Selecting an option toggles its state. A checkmark indicates that the Autocrew is ON. See *Kilo Stations/Kilo Autocrew* for a full description of Autocrew functionality.

**Fire Tube:** This menu option only appears when there is a weapon loaded and ready to shoot. Weapons are loaded in the Fire Control Launch Panel and presets determined in the Fire Control Target Display.

**Arrays/Wires:** Displays one submenu (A towed array is not modeled for the Kilos)

**Floating Wire:** Displays a submenu allowing you to stream or retrieve the wire or stop its deployment at its current length.

**Countermeasures:** Launch either active or passive decoys. From the Orders Menu a depth of shallow (30 meters) or deep (244 meters) can be selected.

## DAMAGE REPORT WINDOW

Lists damage to any station. The text scrolls as necessary. When a station has damage, the damage indicator in the upper right of a station slides out to reveal a wrench. When the wrench is present on a screen, check the Damage Report Window for more specific information on the time required to repair the damage or notification that the damage cannot be repaired. Be aware that parts or all of a station will not work when damage has occurred.

⇒ Click the wrench button in the Task Bar to open/close the window.

## HISTORY WINDOW

Displays the type of history selected by buttons to the left of the window. The newest report appears at the bottom of the scrolling list.

**History Selection Buttons:** A lit button indicates the currently selected History type. If there is a new message in any other window, that window's selection button flashes until that button is selected.



— **Crew Report History:** Lists all orders as acknowledged by crewmembers.

— **Radio Traffic History:** Lists all radio messages received.

— **Multiplayer Chat History:** Displays a history of multiplayer chat messages.

## MANEUVER SHORTCUTS AND GAME READOUTS

**DEPTH:** Keel depth reported in meters. Click/right-click digits to order a depth change.

**KEEL:** Readout of the depth of water below the keel in meters.

**SPEED:** In knots. Click/right-click digits to order a speed change. You cannot enter a speed that exceeds maximum speed for the class.

**COURSE:** Current course in degrees. Click/right-click the digits to enter a new course.

✓ **Note:** Be aware that currents affect Ownship course and speed. It may not be possible to achieve the order course or speed if the

currents are strong. Currents can be turned off/on in the *Options>Game* page prior to mission start.

**TIME:** Displays the time of day in the mission based on a 24-hour clock. When the game is paused, the time display is replaced by the word PAUSED.

- ⇒ Press [P] to pause the game. Press [P] again to resume the game.
- ⇒ Click the numbers in the Time display to pause the game. Click PAUSED in the time display to restart the game.

## TIME COMPRESSION SCALE

In addition to real time, S.C.S. - *Dangerous Waters* supports four levels of time compression. The time scale displays in the far right of the Task Bar. A stack of colored bars represents the level of time compression.

- At real time, a single green bar is displayed.
- At twice real time a lime (yellow/green) bar appears above the green bar.
- At four times real time a yellow bar is added to the stack.
- At eight times real time an orange bar is added.
- At up to sixteen times real time (depending on system capability) a red bar appears at the top of the stack.
- ⇒ Press [.] (period) or [,] (comma) or click/right-click on the scale to toggle through all the time scales

✓ **NOTE:** Time compression is not available in Multiplayer missions.

## KILO SHIP CONTROL STATION [F1]

Because Kilos are diesel instead of nuclear powered, Kilo commanders must be acutely aware of the ship's batteries and ensure that they are adequately charged. See *Kilo Stations/Kilo Ship Control Station/Snorkeling and Charging the Batteries*.

Described below are the dials and gages of the Kilo Ship Control Station.

**DEPTH/GROSS DEPTH:** Both dials provide a means for viewing and ordering depth. DEPTH provides finer granularity. The digital ORDERED depth readout also permits fine-tuning.

- ⇒ Click either dial to order the indicated depth. The black needle indicates ordered depth. The red needle indicates actual depth.
- ⇒ Click or right-click the digits in the ORDERED DEPTH readout to order the sub to the depth entered.

✓ Note: The Kilos have a max depth of 300 meters in S.C.S. - *Dangerous Waters*.

**ROLL:** Indicates the sub's roll during turns.

**TRIM:** Indicates the trim angle of the sub measured from a horizontal axis. A positive trim angle (to the right of zero) indicates the ship has a bow-up attitude. A negative trim angle (to the left of zero) indicates a bow-down attitude.

**COURSE:** Provides a means for viewing current and ordered course and for quickly ordering a new course.

- ⇒ Click on the dial to order the sub to that heading. The grey needle indicates ordered course, the red needle the current course until ordered course is achieved.

**RUDDER:** Provides a means for viewing and changing rudder position.

- ⇒ Click the desired number in the Rudder Indicator to order a rudder change.
- ⇒ Click zero in the Rudder Indicator or click in the Course Indicator to reset the rudder.

✓ **Note:** The sub will eventually turn in a circle if you do not reset the rudder to zero or order a specific course.

**HIGH PRESSURE AIR:** This panel contains the HP Air charge controls and charge readout.

**% HP AIR:** Indicates the charge level in the high-pressure air banks.

**CHARGE:** Initiates a charge of the high-pressure air banks. The charge can be increased by only 10% when the sub is submerged. You must snorkel to fully charge the banks. A minimum charge level of 50% is necessary to successfully launch weapons.

- ⇒ Click the Charge button to commence charging the air banks. A red light surrounding the button indicates the charge is in progress. Click again to secure the charge.

**EMERGENCY BLOW:** When it is imperative to reach the surface quickly, initiate an emergency blow of the ballast tanks. Be aware that conducting an emergency blow and leaving the valves open the entire time reduces the compressed air charge to zero. It is possible to close the valves after a few seconds and let momentum take the sub to the surface. This retains a portion of the charge.

- ⇒ Click either of the Emergency Blow valves to initiate the blow. Click again to close the valves.

**BOW and STERN PLANES:** Indicates current bow and stern plane positions. No player interaction is possible. Your crew controls the bow and stern planes automatically when you change depth.

**SNORKEL:** Raises and lowers the snorkel mast. The mast can only be raised when at snorkel depth (17 meters) or shallower. The mast retracts automatically if the sub reaches a depth that is deeper than snorkel depth.

- ⇒ Click RAISE to raise the snorkel mast. Click LOWER to retract it.

**DIESEL ENGINES:** The diesel engines must be running to charge the batteries and are used to power the sub when on the surface or at snorkel

depth. See *Kilo Stations/Kilo Ship Control/Snorkeling and Charging the Batteries* later in this section for complete steps.

- ⇒ Click START to ignite the engine. The switch moves to the ON position once the engine has started. (The switch moves to off automatically if the sub dips below snorkel depth.)

**ENGINE ORDER:** Click the desired setting on the engine order telegraph to order the associated speed. Flank Speed for Kilo 877 class subs is 17 knots submerged. Flank speed for the Kilo 636 class subs is 20 knots submerged. All ordered speeds are lower when snorkeling and using the diesels to charge the battery.

**ORDERED SPEED:** Provides a digital readout of the current ordered speed based on the speed ordered in the Engine Order telegraph.

**BATTERY:** Indicates the current level of battery charge.

**CHARGE STATUS:** Indicates which diesel is currently charging the battery.

**RATE:** Indicates the current rate of battery charge (+) or discharge (-).

## SNORKELING AND CHARGING THE BATTERIES

When the Kilo is submerged, it runs with an electric motor powered by two banks of batteries, 120 cells each. On the surface it runs on diesel powered engines. The diesel-powered engines not only drive the sub on the surface, they also are used to charge the batteries.

Snorkeling is necessary not only to charge the battery but also to take in fresh air for the crew and for charging the high-pressure air banks. Unlike nuclear powered subs, diesel subs cannot produce their own oxygen. It is important to keep an eye on the battery charge level to ensure that charge levels are sufficient to complete the mission. Traveling at high speeds under the water drains the battery quickly.

- ✓ **Note:** When on battery power and traveling at slow speeds, the Kilo is almost undetectable; however, the snorkeling process creates a great deal of noise that is more easily detected by sonar.

### To Snorkel and Charge Batteries:

Until the sub is at snorkeling depth or shallower, it is not possible to raise the snorkel mast. The diesel engines cannot be started unless the snorkel mast is raised.

1. Enter a depth of 17 meters in the Task Bar shortcut field or from the Orders Menu select *Navigate>Set Depth>Go to Snorkel Depth*.
2. When snorkeling depth is achieved, click RAISE on the Snorkel panel. The light blinks until the mast is fully raised.
3. In the Diesel Engine Panel click START on the Port and/or Starboard switch. When the engine turns over the switch moves to the ON position.

4. When snorkeling and both diesels are started, the ordered speed determines if one, both or neither battery is being charged. How long it takes to charge the battery depends on how fast you are going.
  - ❑ Ordered speed of 0: Neither diesel needed to drive the sub. Both diesels used to charge batteries.
  - ❑ Ordered speed of 1-6 knots: One diesel used to drive the sub, the other to charge the battery.
  - ❑ Ordered speed of greater than 7 knots: Both diesels needed to drive the sub, neither used to charge battery.
  - ❑ Lower speed to less than 5 knots to free one diesel to charge battery. Both diesels must be on.

✓ **Note:** When both diesels are ON and being used to drive the sub, it is possible to go faster than 10 knots. Speed in excess of 10 knots breaks the Snorkel mast.

## CHARGING HIGH-PRESSURE AIR

High-pressure air is required to launch torpedoes and perform an emergency blow. A minimum charge of 50% should be maintained to successfully launch weapons. The sub should be snorkeling to charge the air banks fully and quickly.

1. Enter a depth of 17 meters in the Task Bar shortcut field or from the Orders Menu select *Navigate>Set Depth>Go to Snorkel Depth*.
2. When snorkeling depth is achieved, click RAISE on the Snorkel panel. The light blinks until the mast is fully raised. The mast cannot be raised until snorkel depth or shallower has been achieved. If snorkel depth is exceeded, the snorkel mast lowers automatically.
3. Click the CHARGE button to initiate a charge of the high-pressure air banks.
4. Click the button again to stop the charge.

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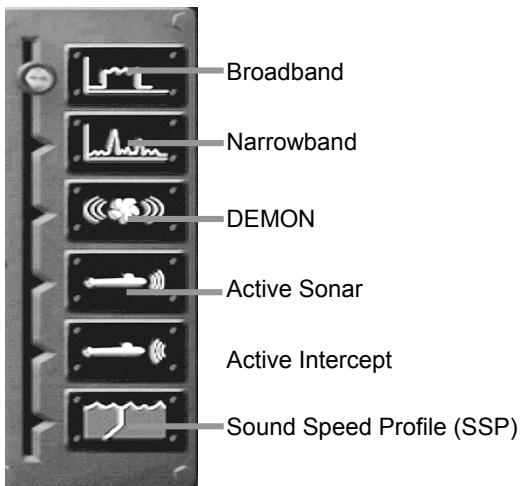
## KILO SONAR SUITE [F2]

See *Training/Sonar School* for sonar information needed to efficiently use the sonar stations.

At the Sonar Stations you monitor the most important sensing equipment on board your submarine. Six displays, each with a specific purpose, help detect, identify, track, and pinpoint contacts by employing either active or passive sonar. The sonar suite is composed of these six displays: Broadband, Narrowband, DEMON, Active, Active Intercept, and Sound Speed Profile (SSP). All six stations are explained in this section.

While the Kilo lacks the towed array available to the other subs in *S.C.S. - Dangerous Waters*, its very capable bow array is modeled and the Kilo is also given a conformal array. For gameplay purposes all subs in *S.C.S. - Dangerous Waters* can deploy Unmanned Underwater Vehicles (UUVs)

that act as remote sensors. Information about UUV sensors and their use is covered in *Kilo Fire Control Suite/Deploying and Wire-Guiding UUVs*.



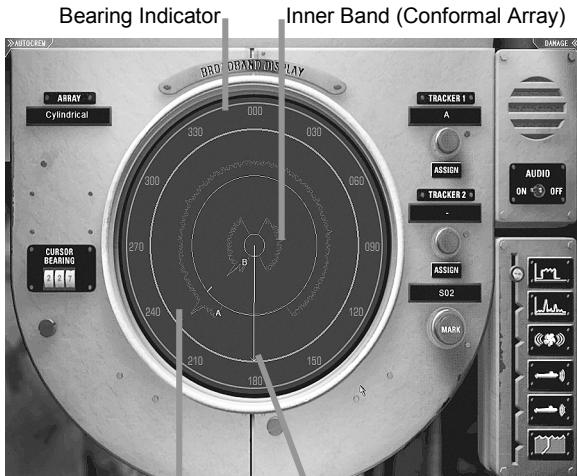
## KILO BROADBAND SONAR STATION

The Kilo Broadband Sonar station displays input from the cylindrical and conformal arrays. These inputs are used to detect and track submarines and surface ships. Here trackers can be assigned to contacts and they are given an alphanumeric Contact Designation or ID. Contact IDs for all sonar contacts begin with the letter S. Trackers provide the TMA station with updates on the contact's bearing at two-minute time intervals.

✓ **Note:** UUV sonar contacts also have Sierra (S) designations, but their data is not reported in the Sonar Suite. UUV data is available in TMA and on the Nav and Fire Control maps.

### ***Kilo Broadband Circular SSAZ Display***

The broadband display in the Kilo is circular and represents Signal Strength versus Azimuth (SSAZ). The SSAZ display consists of two concentric bands extending from an inner circle. Each band represents data from a different ship sensor. The innermost band displays contacts detected by the conformal array. The outer band displays contacts detected by the cylindrical bow array.



Outer band (Cylindrical Array)      Stern Cursor

Click inside a specific circular band to select that array. The outer edge of that band brightens and enlarges slightly indicating that the band and array are selected and the name of the selected array appears in the Array window.

The 360-degree Bearing Indicator rims the outer edge of the Circular Display. A narrow jagged ring near the inner edge of each band indicates background noise on that sensor. Contacts on the arrays appear as spikes emerging from the background noise at a specific bearing and extending toward outer edge of the band; the stronger the signal, the taller the spike.

On the SSAR Display, a thin line extending from the center to the outer edge represents Ownship. The line ends with an arrow indicating the direction Ownship's stern is pointing.

Each sensor display has its own cursor. A cursor appears as a short line extending into the array from each array's outer edge. Click inside the array to move the cursor to that location on that array's bearing indicator or click the cursor and drag it to a new location. The cursor is used to identify the contact you want to mark.

Ship speed greatly interferes with the ability of the Kilo sensors to detect and display contacts. Excessive speed results in the inability to detect any contacts at all. Only background noise is visible and that appears as a thick, jagged band at the outer edges of each array.

**AUDIO Switch:** Click the AUDIO switch to ON to hear broadband audio returns when a contact is selected.

**MARK:** Select a contact on the display and click MARK to assign a contact ID to the contact and send the bearing information to TMA and the Nav and Fire Control maps. The contact ID assigned to the marked contact appears in the window above the MARK Button.

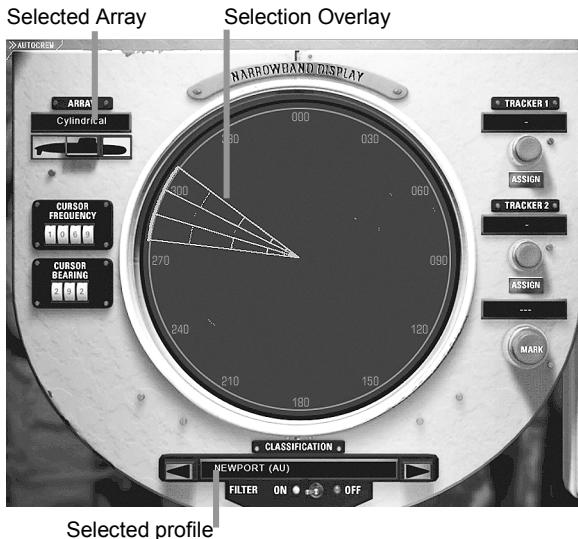
## **Assigning Trackers in Kilo Broadband**

Kilo has two automatic trackers designated A and B. Each is assigned separately.

1. Select the sonar array you want to view in the broadband display. Click inside the desired circle to select it. The outer circle represents the Cylindrical Array; the inner circle represents the Conformal array.
2. Click on the spike point of the desired contact. A vertical cursor appears on the bearing indicator. You can click and drag this cursor along the bearing indicator.
3. Click the appropriate ASSIGN button to assign either Tracker 1 or Tracker 2 to the selected target.
  - ❑ A tracker letter is placed at the base of the spike. A total of two trackers are available and are shared by both broadband and narrowband displays.
  - ❑ If the cylindrical array already has two contacts assigned to the two trackers (A and B) and you designate a new contact, the oldest tracker is unassigned from its current contact and reassigned to the new contact.
  - ❑ As each contact is marked or assigned a tracker, a sequential *Sierra* number is assigned: S01, S02, S03, etc. The Sierra number, also called a Contact ID or Track ID, and all available data on the contact are automatically sent to TMA and the Nav Map.

## **KILO NARROWBAND SONAR STATION**

Each ship class has a unique sound frequency signature. The Narrowband function is used to help classify sonar contacts by comparing the frequency signature of the selected contact against a database of known frequency signatures. The ship's computer narrows the search by presenting only those signatures that have similarities to the signature of the selected contact.



Selected profile

### ***Kilo Narrowband FRAZ Display***

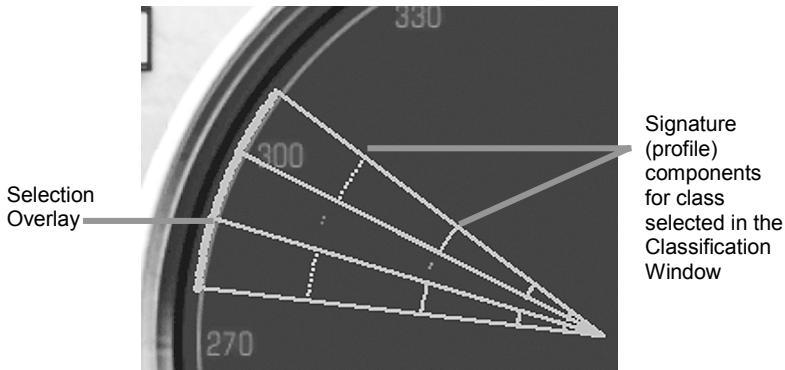
The components and functioning of the Kilo's Narrowband Circular display are described below.

**Narrowband Circular Display:** The Kilo's Narrowband Display is a Frequency vs. Azimuth (FRAZ) display. Lines seen on the FRAZ display represent signals received at specific frequencies and bearings. Signals that appear as lines or dots centered on a specific bearing are **contacts**. The Selection Overlay wedge is used to select contacts. The distance from the center of the display represents the frequency of the signal. The length of each line represents the bearings at which the same frequency signal is received. This length corresponds to the width of the base of a peak on the broadband display.

**Selection Overlay:** The Selection Overlay wedge acts as a cursor for selecting and designating contacts and for displaying the sound signature profiles of ships or weapons with similar signatures.

An imaginary line through the exact center of the wedge is the precise bearing indicator. The bearing at the location of the center of the overlay is seen in the Cursor Bearing readout.

The Selection Overlay is divided into three parts or wedges. The center wedge is used to select contacts. When a contact is selected, the outer wedges display the sound signature for whatever ship class or weapon is selected in the Classification window. When no contact is selected nothing appears in the outer wedges.



- ⇒ Click on any contact line or dot on the circular display to center the Selection Overlay at that location.

See *Kilo Stations/Kilo Sonar suite/Kilo Narrowband Station/To Mark a Contact and Assign a Tracker* and *To Classify a Contact*.

The labeled areas and buttons of the Kilo Narrowband Station are described below.

**FREQUENCY SCALE:** Frequency scale on the FRAZ display runs from the center to the outer edge where the center is zero and the outer edge is whatever scale is selected on the Frequency Scale selector. The default frequency range is zero to 2000.

- ⇒ Click the desired number to switch to that frequency range in the FRAZ display.

**ARRAY:** The array buttons represent the cylindrical array in the bow and the conformal array on midsection of the sub.

- ⇒ Click the desired button to select that array. The selected button is depressed and lit and the name of the selected array appears in the ARRAY window. Data from the selected array appear in the FRAZ display.

**CURSOR FREQUENCY:** This readout displays the frequency at the location where the mouse is clicked

- ⇒ Click the FRAZ display to see the frequency at that cursor location in the Cursor Frequency window.

**CURSOR BEARING:** Displays the bearing at the center of the Selection Overlay.

**CLASSIFICATION:** The names of ship classes with sound frequency profiles similar to that of the selected contact's sound signature are presented one at a time in this window. When a class name is selected here, its sound profile is displayed on the outer wedges of the Selection Overlay when a contact is selected on the circular display. See *Selection Overlay* below.

- ⇒ Click the right and left facing arrows to move forward and backward through the list of available profiles in the Classification

window. Use the information in the window to classify the contact on the Nav Map.

**FILTER:** When ON this feature filters the available profiles to those that most closely match the one selected with the Selection Overlay.

**TRACKER 1 and 2:** The Kilo's two trackers can be assigned in Narrowband Sonar. If these trackers are already assigned to other contacts in Broadband the oldest tracker will be reassigned to the new contact. The tracker designations (A and B) assigned in Narrowband are also visible in the Broadband display, but tracker designations assigned in Broadband are not visible in the Narrowband display. Trackers assigned to contacts detected by the conformal array may not be visible when the cylindrical array is selected.

**ASSIGN:** Click to assign a tracker to the selected contact. You must click on a line in the selected profile before a Tracker can be assigned.

**MARK:** Click MARK to send bearing and Contact ID information on the selected contact to the Nav Map and the TMA and Fire Control Stations. The Contact ID for the marked contact appears in the window above the MARK button.

### ***To Mark a Contact and Assign a Tracker***

1. Select a contact by clicking on it or by dragging the wedge shaped Selection Overlay and positioning the center section over the contact. To move the overlay, click the edge of the overlay and drag it to the desired location.
2. Click on one of the selected contact's frequency lines (or dots) inside the wedge to select it.
3. Click Mark or ASSIGN. You may have to click several times if the signal is weak.

### ***To Classify a Contact in Narrowband***

When a contact is selected in the Narrowband Display, its sound signature displays in the center wedge of the Selection Overlay and the sound signature profile of the ship class named in the Classification window appears in the outer wedges of the Selection Overlay.

1. Click on a frequency dot or line and compare the frequency lines of the selected contact in the center wedge to that of the profile in the outer wedges.
2. Adjust the Frequency Scale selector to see distinct ranges more clearly.
3. Click the FILTER toggle switch to the ON position if it is not already there. When the filter is on, only ships or weapons that have a profile similar to that of the selected contact are available. All platforms and weapons in the game are available for review if the filter is off.

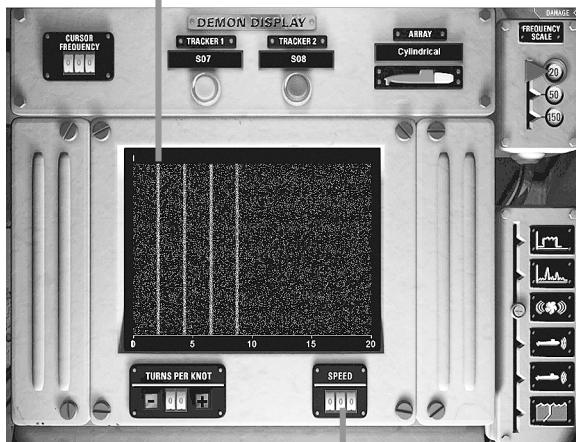
4. Click the left and right facing arrows on either side of the Classification window to view any other profiles that the ship's computer has selected from the profile database.
5. When you decide which profile most closely matches that of the selected contact, leave that class name in the Classification window and click MARK. The contact is marked and the classification showing in the window is assigned to the contact. You will still need to assign an ID and a level of confidence to the contact from the right-click Contact Menu on the Nav Map.

## KILO DEMON SONAR STATION

DEMON is an acronym for Demodulated Noise. The DEMON function is used primarily to determine the contact's speed. This is important information when establishing an accurate firing solution and once determined here the value can be entered in the speed field in your TMA solution.

The main component of the DEMON Station is the DEMON Waterfall Display. The waterfall display separates the selected signal into demodulated components. On the display, the horizontal axis represents frequency and the vertical axis represents time. When a contact is selected its signal appears as parallel vertical lines in the waterfall. The lines represent sound generated by the contact's propeller blades.

Select the first line



Speed of contact given the specified TPK

### Using DEMON to Calculate a Contact's Speed

1. First determine the class of the contact in Narrowband, ESM or the Stadiometer. In the USNI Browser, find the entry for the ship or sub's class and make note of the turns per knot number listed in the TPK field.

2. Ensure that there is a tracker assigned to the desired contact in Broadband sonar.
3. Select the contact you want to analyze by clicking the button below the desired contact ID in the Tracker display. (Sonar trackers must be assigned to contacts in Broadband before their frequency data are available in DEMON.)

✓ **Note:** If the game is paused, no lines appear in the waterfall display.

4. If necessary, adjust the frequency scale to better view the signal. If the lines in the display seem to blur together adjust the FREQUENCY SCALE until the lines are distinct. To adjust the scale, click the desired number in the FREQUENCY SCALE panel at the right.
5. Click and drag the cursor over the line farthest left.
6. If you have not already done so, look up the class information for the class of the selected contact in the USNI Reference Browser.
  - ⇒ Press [ESC] and select USNI Reference. Find the suspected or determined country and class name of the selected contact and look for the TPK number in the Text file. Press [ESC] again to return to the DEMON display.
7. Click the + or - buttons in the Turns Per Knot panel to enter the turns per knot as noted in the USNI Reference file. The speed of the target appears in the Speed readout below the waterfall.
8. When you have determined the speed of the contact, enter that speed in the TMA display for the same contact ID.

### **Using DEMON to Determine Category**

By determining the number of blades on a contact's propeller, listening to the sounds it emits and observing the contact's behavior you can make an educated guess as to the contact's category or type. (Surface or subsurface, warship or civilian.)

1. Select the contact you want to analyze by clicking the button below the desired contact ID in the Tracker display. (Sonar trackers must be assigned to contacts in Broadband before their frequency data are available in DEMON.)
2. The first line on the left indicates the shaft rotation speed. The other lines indicate individual blades on the propeller.
3. If necessary, adjust the frequency scale until the lines display clearly and individually on the waterfall.

3. Use the following criteria to classify the selected contact:

**Merchant Vessels/Tankers:** Typically three or four blades; noisy; often maintains predictable course.

**Warships:** Typically four or five-bladed propellers; quieter, smoother sound than merchant ships; possibly unpredictable course changes.

**Submarines:** Five, six or seven-bladed propellers; very quiet when submerged and at low speed; unpredictable course changes.

**Fishing Vessels/Trawlers/Pleasure Craft:** Three- or four-bladed propellers; noisy; erratic courses and speeds, frequently stopping and starting.

- ✓ **Note:** Turns per knot for military and civilian ships are found in USNI Reference. Click **CIVILIAN** in the Country column then the name of the ship type to find TPK information on Civilian ships.

## KILO ACTIVE SONAR STATION

Active sonar should be used only when absolutely necessary since it provides the enemy with a wealth of information. *S.C.S. - Dangerous Waters* models both medium and high frequency active sonar for all classes of Kilos.

### Medium Frequency (MF) Active Sonar

The cylindrical array in active mode is used to detect and track contacts. Echoes from a single ping or a series of pings are used to determine an object's bearing and range. Information from a medium frequency active search is sent to the TMA station for use in plotting a firing solution for the given contact. While this information is very useful, it comes at a price. Using active sonar gives away Ownship's bearing and alerts any ship in the area to your presence. The ship may well assume you have hostile intentions since active sonar is used primarily for targeting.

### Kilo MF Active Sonar Display

The display shows the results of active sonar echo ranging. Speckled areas represent echoes from the ocean background, reverberation, in general. The area of blank space represents the active sonar baffles. Since the signals transmitted from the bow array cannot reach the area behind the ship, no echoes are returned from that area.

In the Kilo's circular Active Sonar display the area closest to the center represents objects closest to the ship. The circle represents bearing. The screen updates from the center out. Each subsequent ping replaces the oldest data with the newest. The Kilo's Active Display is seen below:

Active Sonar Bearing-Range Cursor



Contacts appear as brighter spots on the active display. A high-pitched metallic ring or ping is heard as each contact displays. In continuous mode the active display shows a four-ping history, which is useful in detecting contacts with weak signal strength

The Bearing-Range Cursor on the active display consists of a circle attached to a vertical line that indicates a specific bearing. The distance of the circle cursor from the center of the circle represents its range from Ownship. The position of the vertical line on the Bearing Indicator represents the bearing of the cursor.

### To Mark a Contact with Active Sonar

1. Click the number of the desired range on the Range Scale (KM) selector. Longer ranges are appropriate for the initial search. Once a contact is detected, you can adjust the range scale of subsequent transmissions to improve the accuracy.
  - ❑ Selecting a new range halts continuous transmissions. You must click transmit again to resume transmissions.
2. Select transmission mode: Single or Continuous pings. If Single is selected, only one active sonar ping is transmitted. When Continuous is chosen, active sonar pings are transmitted at a set interval until the switch is reset to Single or you change the range scale.
3. Click TRANSMIT to send signals of the type selected in the toggle switch above.

✓ Note: To stop the transmission of continuous pings on any of the submarines, click again on the **TRANSMIT** button.

- ❑ A valid contact gives consistent visual returns that are brighter than background noise or reverberations. The audio return will

have a distinctive metallic ring to it and will be distinguishable from the background noise.

4. Click on a contact to select it with the Bearing Range cursor or click and drag the cursor to center it on the contact. The contact's range and bearing display on the left side of the screen in the Range (M) and Bearing windows. Range is in meters.
5. Click MARK to assign an alphanumeric Contact ID to the selected contact. Once a selected contact has been marked, selecting it and clicking MARK again sends an update of the contact's range and bearing to TMA and the Nav Map. Contacts marked with Active Sonar appear on the Nav Map on the detected bearing and at the detected range at the end of a green line of bearing (LOB)

### **Kilo High Frequency Active Sonar**

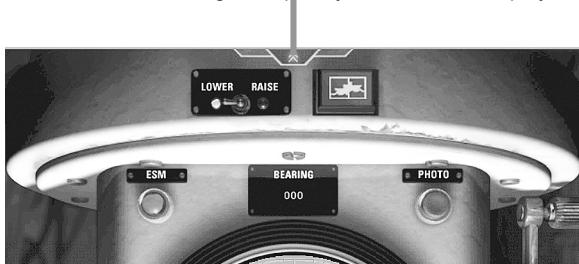
High Frequency active sonar (HFAS) has a shorter range and can detect smaller objects than medium frequency active sonar. When you must navigate a minefield, HFAS can be used to locate and mark mines near your sub. Once a mine is located, maneuver quickly to avoid it by the largest possible margin. Driving slowly provides the best reaction time. Marking the mines helps you keep track of the location of the mines should you need to traverse the field again when you leave the area. One method to find a safe route is to follow another ship's path.

The Kilo's High Frequency Active Sonar (HFAS) can only be reached from the Periscope Station. The Kilo's HFAS has a range of 3500 yards.

### **To View and Mark Kilo's HF Sonar Returns**

1. Press [F8] or select the periscope icon button in the Stations Menu to move to the Periscope Station.
2. At the top of the Periscope screen click the transition button to move to the High Frequency Sonar Display.

Transition button to High-Frequency Active Sonar Display



3. The HFAS is always on when the station is accessed. Depending on its range from OS, a contact appears as a dot or a 3D outline of the contact. Click the HFAS Display to place a marker on the Nav Map for all contacts detected by the sensor. No contact IDs are assigned to HFAS contacts and no information is sent to TMA.

## KILO ACTIVE INTERCEPT SONAR STATION

The Active Intercept Display alerts you to when another ship, sub, dipping sonar or sonobuoy is transmitting an active sonar ping. It provides the bearing of the transmitting entity as well as the frequency of the detected emission, the age of the last signal and the strength of the signal. Knowing the signal strength can assist you in determining the relative proximity of the active sonar source.

When Active Intercept detects an active sonar ping, a line is seen on the active intercept display on the bearing of the contact.

**FREQUENCY (HZ):** Displays the frequency of the intercepted signal. (Active Sonar Frequency ranges can be found in the USNI Browser in the SENSORS entry.)

**BEARING:** Displays the bearing of the intercepted signal.

**INTERVAL (SEC):** Displays the time interval (in seconds) between the last two intercepted signals.

**AGE (SEC):** Displays the time in seconds since the last intercepted signal.

**MARK:** Assigns a Contact ID to the selected signal and sends the bearing information to TMA and the Fire Control and Nav Maps. Each time a previously marked contact is marked again the current bearing of that contact is sent to TMA.

- ⇒ To select a signal, click on the signal line in the Active Intercept Display. The cursor moves to select the signal on that bearing.
- ⇒ When the signal is selected, click MARK.

**ACTIVE INTERCEPT DISPLAY:** A line or wedge emanating from the center of the circular display to its outer edge indicates the bearing of an intercepted signal. A thicker wedge indicates a strong contact.

## KILO SSP SONAR STATION

The Sound Speed Profile (SSP) Station displays the speed at which sound is transmitted at various water depths in the area around Ownship. Ocean water typically forms distinct layers of density that can profoundly affect sonar transmissions. Warmer, less dense water forms the upper surface duct—below this, temperatures fall off sharply and density increases. The effect of this process is sound generated in one layer doesn't tend to transmit easily to the other layer, and vice versa. At the beginning of any mission, always check the depth at which the surface duct separates from the lower thermal. (See *Training/Sonar School/Underwater Sound Propagation* for more information on thermal layers.)

The Sound Speed Profile is created from information returned from an Expendable Bathythermograph (XBT) probe. When launched, the probe reports depth and sound speed information in both graph and table form.

### ***Launching an XBT probe***

The results of the last XBT probe are visible in the display window and on the tablet when the SSP station is first entered.

- ⇒ Click the XBT button. The previous results are cleared from the display and the tablet when a new XBT is launched.
- Updated information does not appear instantly on the screen. The XBT probe rises to the surface and then descends before it begins reporting. This may result in a delay before the SSP updates. The layer depth is noted at the bottom of the tablet.
  - ⇒ To change the depth scale in use on the graph, click the desired number in the Depth Scale Panel.

✓ **Note:** Due to varying water temperatures at locations around the world, a distinct thermal layer is not always present. The mission designer designates the type of layer for the mission.

## KILO UUV SONAR

In S.C.S. - *Dangerous Waters* all submarines are given Unmanned Underwater Vehicles (UUVs). These UUVs act as remote sonar sensors. Merging TMA bearing information provided by a remote sensor with data from your ship's sensors can provide a fairly accurate assessment of the range to the contact. UUVs are particularly useful when navigating minefield and can be operated in Passive or Active mode.

The UUV itself appears as a contact in the Broadband and Narrowband Displays but UUV sonar returns are not viewed in the Sonar Suite. UUV sonar contacts display on the Nav and Fire Control maps and in TMA.

UUVs are launched from the Fire Control Station and are wire-guided like torpedoes from there. See *Kilo Stations/Kilo Fire Control Suite/Deploying and Wire-Guiding UUVs* for complete information.

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## KILO RADAR STATION [F3]

Submarine radar should be used with caution and only when the situation mandates its use. When you use radar you communicate your presence, your bearing, your proximity and who you are if the other platform is equipped with EW or ESM equipment.

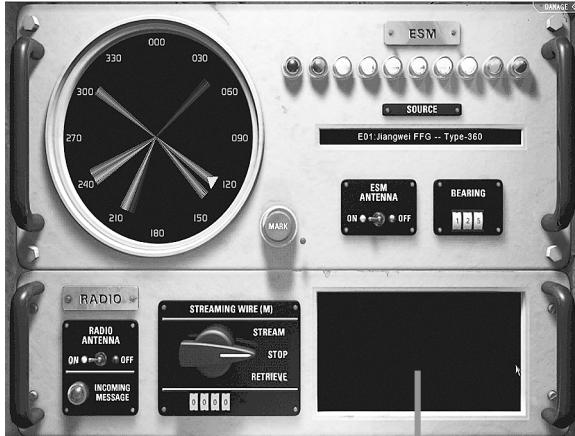
### MARKING CONTACTS WITH RADAR

1. Ensure that you are at radar depth (17 meters) or shallower and moving at 8 knots or less if the sail is submerged. (The sail may broach if you order a depth shallower than 17 meters.)
2. Click **RAISE** in the lower right of the station to raise the mast. The READY light glows when the radar mast is extended and radiating.
3. Set Range Scale as desired and turn on Range Rings in the upper right of the station if desired.
4. Contacts show up as brighter spots on the display. Click a contact to select it with the Bearing-Range Cursor.
5. Click **MARK** to send the contact's bearing and range to TMA and the Nav Map.

✓ **Note:** Radiating while submerged destroys the radar.

## KILO RADIO-ESM STATION [F4]

In S.C.S. - *Dangerous Waters* the ESM (Electronic Support Measures) station and the Radio Room are combined. ESM allows you to detect and classify contacts when at periscope depth. The radio is used to receive intelligence and tasking updates and share Link data while underway.



Radio Message Window

### ELECTRONIC SUPPORT MEASURES (ESM)

The ESM mast is designed for the passive detection of radar emissions. This sensor detects any platform in your area that is employing radar. Because you must have the ESM mast exposed, you make your ship vulnerable to detection when using ESM.

The ESM sensor provides a bearing to detected contacts. The ship's computer analyses the detected transmission and compares it to those in its database thus providing the class of the transmitting platform.

#### **Detecting and Classifying Contacts with ESM**

1. Come to ESM mast depth (**18 m**) or shallower and maintain a speed of 10 knots or less if the sail is submerged before raising the ESM mast.
2. Click the ESM ANTENNA switch to the ON position to raise the mast. When the triangular cursor appears in the ESM Display, the ESM is in detection mode. Contacts appear as lines emanating from the center of the display on a specific bearing.
3. Click a contact signal in the ESM Display to determine contact bearing and to view the source of the signal. (The name of the detected emitter appears in the SOURCE field.) The bearing to the contact appears in the Bearing readout.

4. Take note of the intensity of the contact on the ESM Display and the number of ESM Signal Strength Indicator lights that are lit. A strong signal can indicate that the contact is relatively close. (Green indicates a weaker signal, red a strong one.)
5. Click a contact signal to select it then click MARK. This assigns an alphanumeric contact ID to the contact and sends it to TMA and the Nav Map. ESM contacts have **E** designations (E01, E02, etc.). Once marked the Contact ID appears in front of the Emitter name in the SOURCE field.
  - ❑ When MARK is clicked, the contact selected in the ESM display is automatically assigned a classification determined by the ships computer. This classification is based on platforms known to carry the detected emitter shown in the SOURCE field. When the contact is selected on the Nav Map the DDI will list that class name in the CLASS field. You must still assign an ID (Hostile, Friendly etc.) from the Contact Menu on the Nav Map.

## RADIO ROOM

The lower portion of the Radio/ESM console represents the Radio Room. Here messages containing important intelligence and tasking information are received and contact positions are downloaded from any platforms in the area that are part of your Link network. (The link is modeled for all controllable platforms in S.C.S. – *Dangerous Waters*. Any platforms on Ownside are part of your Link.)

When your submarine starts a mission submerged, you see no Link data on the Nav Map even though Show Link Data is on by default. To determine if there are Ownside platforms (members of the Link) in your area you must come to communications depth (comms depth) and follow the steps below. When Link information is downloaded any surface and air Link participants and any contacts they have detected appear on the Nav Map. You may never see the symbol for any submerged Link participant that is in the mission.

### Receiving Radio Messages and Link Data

To receive messages you must come to communications depth (comms depth: 19 meters) or shallower and raise the radio mast, or stream the floating wire antenna. There are advantages and disadvantages to both modes. The radio mast receives messages more quickly but exposing the mast leaves you vulnerable to detection. The floating wire receives messages far more slowly but you do not need to expose a mast or go as shallow to receive messages. Follow these instructions to deploy the radio mast or floating wire.

1. Select either the floating wire antenna or the radio antenna mast to receive the message.

**Radio Mast:** Take the ship to **19 meters** and set ship speed to 8 knots or less when the sail is submerged to avoid damaging the mast when it

is raised. When the depth and speed prerequisites are met, click RAISE under Radio Antenna to extend the radio mast.

**Streaming Wire:** You do not have to come to comms depth but it helps to be fairly near the surface. Set ship's speed to 18 knots or less to avoid damaging the wire. Slower speeds allow the wire to float up more quickly. If speed exceeds 5 knots, the wire may never reach the surface of the water. Make sure the wire is streamed to at least half of its length in order to ensure message reception. In the Streaming Wire panel click STREAM. The readout below the switch indicates the length of the wire that is currently deployed. Click STOP when the desired length has been deployed.

2. Look at the message screen for incoming messages. A scroll bar appears in the message window if there are more messages than can be displayed at one time. The newest message traffic is always at the bottom of the scrolling text. Message traffic may not appear immediately. When a message is received, the INCOMING MESSAGE light glows briefly.
3. Look at the Nav Map if you are waiting for Link Data to determine when the information has been downloaded.
  - Single player mode: If another Ownside platform in the mission is a submarine, you must both be at comms depth with a mast or the antenna deployed before you see him as part of your Link Data. Since it is unlikely that these conditions will be met, you may never see an Ownside sub in your Link download.
  - Multiplayer mode: If another Ownside sub is player driven, you *both* must be at comms depth with the radio mast extended at the same time before you will see each other. If you have your radio mast extended and he has his floating wire out, he will see you but you will not see him. The radio mast is needed to transmit position data.
4. After the desired information has been received, click LOWER to lower the Radio Mast or RETRIEVE to retrieve the streaming wire.

✓ **Note:** Radio message text also appears in the Radio History Window on the Task Bar. When a new message is received, the radio history selection button (the green square) on the Task Bar flashes until the button is selected. You can raise and lower the radio mast from the Task Bar's Orders Menu from any screen provided you are at a safe depth and speed.

### **Promoting Contacts to the Link**

In some cases the Link participants in your area could be unaware of a contact that you have detected if the contact is out of range of their combined sensors. In this case you may want to promote your contact to the Link to share it with other link participants in your area. (Your contacts are not automatically shared with the Link participants as theirs are shared with you in single player games.)

During Multiplayer games contacts detected by Ownside platforms controlled by other players do not share data across the Link automatically as the AI Ownside platforms do. Part of your task in Multiplayer games is to promote your contacts to the Link so that other Ownside Link players can see your contacts. Other players must promote their contacts before you are able to see them on the Nav Map. You are only able to see them when Show Link Data is on.

Just as you must raise your radio antenna or float the wire to download Link updates, you must also come to communications depth (comms depth) and raise the radio antenna before you can to promote your contacts to the Link.

1. Come to comms depth (**19 meters**) and raise the radio antenna.
2. From the Nav Map, select the contact you want to promote. From its Contact Menu (right-click menu) classify the contact as surface or subsurface if known and apply any alliance or class information that you have to the contact.
3. If possible determine an accurate firing solution and enter it at the TMA station.
4. From the Contact Menu select Promote to Link. In the DDI a new field appears labeled "**Promoted**". This field displays the time in the mission at which you promoted the contact to the Link.

The contact's symbol appears on the Nav Map of any players in a multiplayer game that are part of Ownside and have access to the Link. A 4-digit track ID is assigned based on your Platform ID. This 4-digit number is seen in parentheses following the time of promotion in the "**Promoted**" field. In single player games, AI platforms attack contacts that you have promoted as hostile. The AI investigates contacts promoted as Unknown. See *Navigation Station/2D Navigation Map/Contact Menu/Promoting a Contact to Link* for more information.

✓ **Note:** If the only other player in your Link is a submarine, you must both be at comms depth with your Radio Masts extended in order to share data across the link.

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## KILO NAVIGATION STATION [F5]

The Navigation Station, with its Nav Map and 3D View is the default view when entering a mission. The Navigation Station functions the same regardless of controllable platform and is covered only once in this manual in *Navigation Station*.

## KILO OWNSHIP/ORDERS MENUS

Click the Ownship NTDS symbol on the Nav Map to select it, then right-click on the selected symbol to display the Ownship Menu. The majority of the functionality contained in the Ownship Menu is also contained in the Orders Menu. These are described in *Kilo Stations/ Task Bar/Orders Menu* earlier in this section. The rest of the Ownship options require the use of the Nav Map. These are the same across platforms and are described in *Navigation*

*Station/2D Navigation Map/Ownship Menu.* Several options are unique to the submarines in S.C.S. – *Dangerous Waters*.

**Fire Tube [X]:** This option appears in the Ownship Menu only when a target is assigned to a tube and the tube is readied to fire in the Fire Control Station. When all that is left to do is fire the tube, this option is available. Select it to fire the designated tube.

## KILO CONTACT MENU

The Contact Menu appears whenever you right-click on a selected contact's NTDS symbol. Most Contact Menu items are the same across platforms and these are covered in Navigation Station/2D Navigation Map/Contact Menu. Several options are unique to the subs in S.C.S. – *Dangerous Waters*.

**Engage With:** The weapons you see in the *Engage With* option are described in the *Kilo Stations/Kilo Fire Control Suite/Kilo Tactical Weapons* and *Kilo Strategic Weapons* portions of this section. Only weapons appropriate to the selected target are available. Others are greyed out.

**Spec Ops:** This option is only visible when the mission designer has included the Deep Submergence Rescue Vehicle or a Special Forces team in the mission. It displays a submenu of Special Operations. Follow tasking messages in the mission for specifics on deploying the special ops units in the game. (The Kilo is given the Russian DSRV for gameplay purposes.)

**Deploy DSRV:** Select this option to Deploy the Deep Submergence Rescue Vehicle to travel to the selected contact. This option is only selectable when the following conditions are met:

- The DSRV is present on the sub's hull. (The DSRV is only available if the mission creator added it to the mission.)
- The selected contact is a submerged submarine.
- Ownship depth is greater than periscope depth.
- Ownship speed is 3 knots or less.

**Deploy Special Forces:** This menu is greyed out until speed and depth requirements are met. It is available only in the Contact Menu only under these conditions:

- The selected contact is a surface ship or landbased target (Category: Stationary) such as a building or the floating Oil Rig.
- Ownship has Special Forces aboard.
- Ownship is traveling at periscope depth or shallower and at 3 knots or less.

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## KILO FIRE CONTROL SUITE [F6]

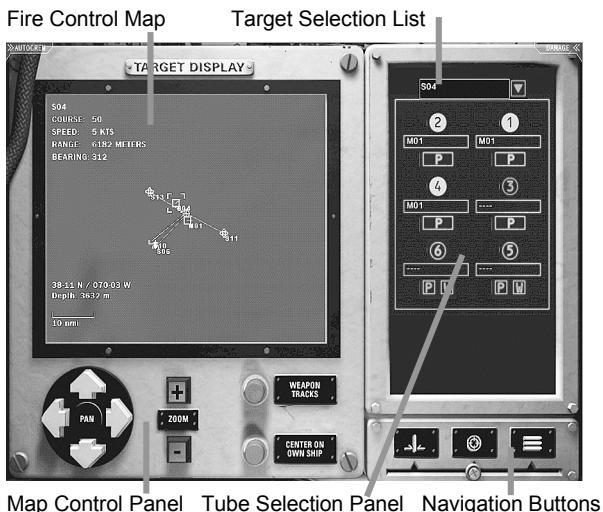
The Kilo's Fire Control Suite consists of three stations: the Target Display, the Launch Panel and the Weapons Inventory. These stations are reached

by clicking one of the navigation buttons at the bottom right of the Kilo's Fire Control Stations. Target Display is seen as default at game start.



## KILO FIRE CONTROL TARGET DISPLAY

The Kilo Target Display consists of the Fire Control map, the Target Selection List, the Tube Selection Panel and the Map Control Panel. These areas are described here. See *Kilo Stations/Kilo Fire Control Suite/Basic Launch Procedures* for information on how to use the displays and panels to launch weapons, mines and countermeasures.



### Fire Control Map

All sensor contact symbols seen on the Nav Map are also seen on the Fire Control map. If you have Show Link Data on, Link participant symbols and Link contact symbols also appear. The TMA or Link solution data for a selected contact appears in the upper left corner of the map in the Fire Control DDI area. This solution data is constantly updated assuming the course and speed designated when the solution was entered in TMA or provided by the Link. This information is used by the Fire Control System to predict the location of the target so the weapon can steer an intercept course until it is close enough to detect the target and begin homing.

You are allowed to target Link contacts as well as Link participants from the Fire Control Station, however the latter is not recommended. Link contacts

are only available if you have first downloaded Link data. Link contact positions are not updated once you lose radio contact. See *Kilo Stations/Kilo ESM/Radio Station*.

- ✓ **Note:** If Show Truth is ON, no Contact IDs appear in the Target Selection List. Only Snapshots (bearing only) can be assigned to a weapon.

## **Fire Control Map Controls**

Below the Fire Control Map are several buttons used to help narrow the view or display only the data that you wish to see.

**PAN:** When the map is zoomed in, click the PAN buttons or click and drag on the map or use the keyboard arrow keys to adjust the map view.

**ZOOM:** Click + in the ZOOM controls or press [CTRL] and click the map to zoom in on the clicked location. Click – in the ZOOM controls or press [CTRL] and right-click to zoom out.

**WEAPON TRACKS:** When this button is ON (lit) all waypoints assigned to any land attack missile or mine display on the map. When this option is OFF only the waypoints for the weapon assigned to the selected contact show on the map. Click to toggle the state of this button.

**CENTER ON OWNSHIP:** When this button is ON (lit) the Ownship symbol is centered in the Fire Control map when the map is zoomed.

**Keyboard Controls:** When the cursor is in the map, press [SHIFT] + X to toggle the display of the Longitude and Latitude and depth display. Select [SHIFT] + Z to toggle the display of the range scale.

## **Fire Control Target Selection List**

At the top of the Tube Selection Panel area is the Target Selection dropdown list. This drop-down list contains all of the contacts currently marked by Ownship. A Contact ID selected in this list is available for assignment to a specific tube as described below with the following caveats.

**Contact with a LOB:** Contact IDs for contacts with a line of bearing (no TMA solution) cannot be assigned to a tube. They can be targeted with a snapshot.

⇒ Create a TMA solution for the contact to make it available for tube assignment.

**Unknown Category Contacts:** Contact IDs for contacts that have a TMA solution but have not yet been classified as either a surface or sub surface platform type cannot be assigned to a tube. See Note In *Tube Selection Panel* below. A snapshot can be assigned.

⇒ Select the contact in the Nav Map and from its right-click menu designate it as surface or subsurface to make it assignable.

**Link Contacts:** Link contact IDs and Link participant IDs appear in the Target Selection list when Show Link Data is ON.

### Tube Selection Panel

From the Tube Selection Panel contacts are assigned to specific tubes and weapon presets are entered. Torpedoes and UUVs can be wire guided from tubes 5 and 6 only. Wire guide controls for these tubes are accessed from the Tube Selection Panel by Clicking the W once the weapon is launched.

A number represents each of the Kilos six 53 cm torpedo tubes.

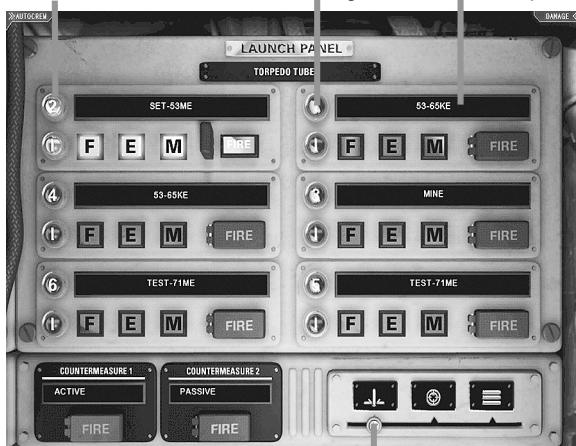
- ⇒ Select a contact ID from the Target Selection List.
- ⇒ Click the number of the desired tube to assign the weapon in that tube to the selected target.

✓ **Note:** Certain weapons can only be used against submarines. You are not able to assign a sub-only weapon to a target designated as a surface contact. Until a contact is classified as surface or subsurface, it cannot be assigned to any tube.

### KILO FIRE CONTROL LAUNCH PANEL

From the Launch Panel weapons selected in the Target Display are launched. Prior to launching a weapon the tube must be flooded, the pressure equalized and the muzzle door opened. Once these steps have been completed, the weapon can be fired. Once the launch procedure is initiated for a tube, the name of the weapon in the window is greyed out and the weapon cannot be changed until the launch procedure is halted and the steps reversed.

Tube Number   Interlock Indicator Light   Name of Weapon loaded



## Basic Launch Procedure

1. Assign a target to a tube in the Target Display and assign Preset values, then find the corresponding tube number in the Launch Panel.
2. Click **F** to flood the tube.
3. Click **E** to equalize the water pressure in the tube.
4. Click **M** to open the muzzle door. The tube number and the interlock (I) lights are illuminated indicating that the weapon is ready to fire.
5. Click **FIRE** to lift the cover; click again to fire the weapon.

✓ **Note:** If you have not yet assigned a target to the tube, the FIRE button is disabled and the tube number does not illuminate. Once a target is assigned in the Target Display the tube number illuminates and the FIRE button is enabled.

6. To wire-guide a torpedo with that capability from tube 5 or 6, return to the Target Display screen and click the **W** next to the number of the tube you fired. **W** stands for wire guidance. See *Kilo Stations/Kilo Fire Control Suite/Targeting Sea Contacts /Torpedo Wire Guide Controls*.

**Tip:** If a tube number does not light up and the Fire button does not respond check to make sure there is a target assigned to the tube. Also check the High-Pressure Air bank in Ship Control. A weapon launch requires a charge of at least 50% in your air banks. Air banks are charged at the Ship Control Station.

## To Reverse the Launch Process Prior to Firing:

Until the weapon is actually fired, the launch process can be reversed. In this situation the steps must be manually reversed, one step at a time. The

muzzle doors must be closed and the tube re-pressurized and drained allowing a different weapon to be loaded.

- ⇒ Click the buttons in the reverse order (M then E then F) to prepare the tube for reload. The button flashes and goes dark indicating the next button can be clicked. Reload the tube as described below.

## **Countermeasure Launch Procedure**

1. Determine the type of countermeasure needed. Change loadout if necessary.
2. Click FIRE to open the cover, and click again to fire the countermeasure.
3. To select a different countermeasure or load an empty tube, click the name of the countermeasure. Continued clicks cycle through the available options.

## **Tube Reload Procedure**

The Kilo's automated torpedo reload system requires only two minutes to reload an empty tube. To remove a weapon from a tube and replace it takes about twice as long.

The text appears red in the Weapon Name Display Window if the weapon can be changed. If the text is grey, the tube is locked and the weapon cannot be changed until the tube is drained.

- ⇒ Click the red text in the Weapon Name Display Window to cycle through weapons available for that tube until the desired weapon name appears. The tube number flashes until the weapon is loaded.

If the tube is empty because a weapon has been fired, the tube cannot be reloaded until the tube is drained.

- ⇒ Click **M** to close the muzzle door and the process reverses automatically. Remember that closing the muzzle door cuts the wire on torpedoes and UUVs.

- ✓ **Note:** A torpedo or a UUV can no longer be wire-guided once the muzzle door of the tube that fired it has been closed. Closing the muzzle door cuts the guidance wire.

- ⇒ If the tube is flooded and the weapon has not been fired, the buttons must be clicked in reverse order (**M, E, F**) to prepare the tube for a weapon change.

- ✓ **Note:** The unload/load process takes approximately four minutes. Loading an empty tube takes 2 minutes. If the **Fire Control Quick Launch** option is selected in the *Options>Game* screen the length of time it takes to unload then reload a tube is cut to 35 seconds and loading an empty tube takes 20 seconds.

## TARGETING SEA CONTACTS

1. To assign a contact to a tube, select the desired Contact ID from the Target Selection List or click a contact symbol on the Fire Control map to automatically select it in the list.
  - ❑ To send a weapon down a specific line of bearing, select Snapshot from the Target Selection List.
2. Click the number of a tube containing a weapon appropriate for the target. The contact ID appears below the tube number indicating this contact is now assigned to this tube.
  - ❑ See *Kilo Stations/Akula Fire Control Suite/Akula Fire Control Target Display/Fire Control Target Selection List* above for instances that prevent a contact from being assigned to a tube.
3. Click **P** below a tube number to display the presets for the weapon. For information on all presets see *Kilo Stations/Kilo Fire Control Suite/Kilo Weapon Presets*.
  - ❑ If your Fire Control Auto Crewman is on, he enters the presets for you.
  - ❑ For a Snapshot, enter the desired LOB along with other desired presets.
4. When presets are entered click the Launch Panel icon and initiate the launch procedure for the desired tube. See *Kilo Stations/Kilo Fire Control Suite/Kilo Fire Control Launch Panel/Basic Launch Procedures*.
5. Once a wire-guided torpedo is launched from tube 5 or 6, click the **W** button to display its Wire Guide Controls.

### Torpedo Wire Guide Controls

Only tubes 5 and 6 on the Kilo can fire wire-guided torpedoes. Once a torpedo is fired, its symbol appears on the Fire Control map. When the weapon enables, two red lines extend from the torpedo symbol indicating the weapon's search cone. Until a torpedo enables, it can be wire-guided.

- ⇒ Click **W** below the desired tube to wire guide the torpedo from that tube. The **W** is only selectable if the tube has fired a torpedo that can be wire guided.

**Heading:** Click the right facing arrow to increment the weapon's ordered heading. Click the left facing arrow to decrease the ordered heading.

**Enable:** Click to enable the weapon before it reaches the enable distance set in the *Run To Enable* preset and start the weapon in its search mode.

**Pre-Enable:** Click to return an enabled weapon to its pre-enabled state without shutting the weapon down entirely. If you want to wire guide a weapon that has already enabled and started its search, click this option. The red enable cone disappears. Once the weapon detects a

contact and begins homing, it can no longer be pre-enabled. It can only be shutdown.

**Shutdown:** Click to shut down the weapon entirely. The weapon cannot be enabled again if this option is selected.

- ✓ **Note** A torpedo is searching as long as it is snaking or circling (as set in the presets). If the weapon heads on a straight path, it is homing.

## ATTACKING LAND TARGETS

Only the Chinese Improved Kilo Hull 368 is capable of firing the 3M-14E Klub Land Attack Missile. To attack a land target from Fire Control, the latitude and longitude coordinates of the site must be fed into the fire control system and a series of waypoints defined for the missile to follow. The coordinates are usually defined in a tasking message.

1. Set Ownship depth to 100 meters or less and a speed of 6 knots or less. Do not fire the missile until this depth and speed have been achieved or the missile will fail.
2. Select a tube containing a land attack missile. Click **P** to open the Preset Panel for the tube.
3. Click **DEFINE TARGET WAYPOINTS** then click the Fire Control map to place four weapon waypoints. The number next to the last waypoint indicates the tube number.
  - ⇒ Click a waypoint to enter exact coordinates in the Latitude and Longitude presets or click and drag the waypoint to the desired location. Watch the latitude and longitude readout in the lower left corner of the Fire Control map as you drag the waypoint to determine its current location.
  - ❑ The outermost waypoint should be placed at the exact latitude and longitude of the target as specified in your orders.
  - ❑ If a landfall waypoint is directed in your tasking make sure that one of the earlier waypoints is placed at that latitude and longitude.
4. Set the destruct range for the missile. This is the range at which the missile will self-destruct if it has not encountered a target.
5. Initiate the launch procedure for the tube in the Launch Panel.

- ✓ **Note:** Land sites with Link Contact IDs can be targeted from the Nav screen using the Contact Menu's Engage With command.

## LAYING A MINEFIELD

The steps for laying a minefield are seen below.

1. Check your tasking or determine the exact latitude and longitude for each mine to be placed.
2. Determine which tube will fire the mine destined for each specific location. From the Launch Panel, load the desired tubes with mines.
3. In the Target Display Panel select each tube individually and place a waypoint for that mine to follow. Click **P** then click **DEFINE TARGET WAYPOINT** and click the Fire Control map to place the waypoint.
4. Select the waypoint and drag it to the desired location using the lat/long readout at the bottom of the Fire Control map. You can also enter the desired latitude and longitude in the waypoint presets.

The waypoint presets appear below the Define Target Waypoint button in the preset panel as soon as the waypoint is placed on the map.

**Tip:** Once mines are loaded and presets are entered, you can fire the tube from the Nav Map using the Ownship or Orders Menus' **Fire Tube** command. Map markers can be placed on the Nav Map indicating the mine location and a launch point for the mine designated for that location. Using this method you can better tell when to fire the tube. *See Navigation Station/2D Navigation Map/Map Menu.*

5. After firing the mine, reload the tube with a new mine or weapon.

## DEPLOYING AND WIRE-GUIDING UUVs

Because a UUV is a sensor, not a weapon, it need not be assigned a target in the Target Display to be fired.

1. Set Ownship speed to 4 knots or less. Do not launch the UUV until that speed has been achieved.
2. To launch a UUV to a depth other than Ownship depth, first select the tube containing the UUV in the Target Display and click **P** to display its presets.
3. Click the checkmark to deselect *Use OS Depth* and display the *Depth* preset. Click a digit to increment its value. Right-click to decrease the value.
4. Select the desired tube in the Launch Panel and initiate the launch procedure as for a torpedo. (Only tubes 5 and 6 can launch UUVs since they require wire guidance.)
5. From the Target Display click **W** below the tube that fired the UUV to display the wire guide controls.

If a UUV is in a tube it can be launched from the Orders or Ownship Menus using the Fire Tube command without visiting the Fire Control Station. It will be launched at Ownship's depth.

## Wire-Guiding and Enabling UUV Active Sonar

1. From the Target Display select **W** below the tube that fired the UUV to display the wire-guide controls.
2. Click the Ordered Course arrows to adjust the course of the UUV.
  - ❑ Passive sonar mode is on by default when a UUV is launched but active sonar mode can be enabled at any time as long as the wire is still attached and the 30-minute battery is functioning. Be aware that capable ships and subs in the area can detect UUV active sonar. However, active sonar may be necessary when traversing a minefield. Follow these steps to enable UUV active sonar.
3. Click **ENABLE** to initiate active sonar.
4. Click **PRE-ENABLE** to de-activate active sonar and return to passive mode.

✓ **Note:** Closing the muzzle door after launching the UUV cuts the guidance wire. Once the wire is cut the UUV no longer sends sonar returns.

## UUV Returns

Sonar returns from the UUV are automatically assigned a Contact ID and can be found in the TMA SELECTED TRACK drop-down list and on the Nav and Fire Control maps. UUV sonar returns do not show up on any of the screens of the Sonar Suite although the UUV itself displays as a contact in Broadband and Narrowband Sonar. Depending on its course, the UUV may provide returns on Ownship.

- ❑ A contact detected by a UUV in passive mode appears on the Nav Map as a yellow *Unknown* symbol at the end of a white line of bearing that extends from the location of the UUV at a default range of 10 nm.
- ❑ A contact detected by a UUV in active mode appears as a yellow *Unknown* symbol at the end of a green line of bearing. The length of the LOB indicates the range of the contact from the UUV.

✓ **Note:** UUVs cannot be retrieved. Once the battery is expended you need only close the muzzle door to cut the wire and jettison the UUV. The tube can then be re-loaded. Altering Ownship's course by more than 90° cuts the wire. Once the wire is cut the UUV no longer sends sonar returns

## KILO WEAPON INVENTORY STATION

The Weapon Inventory simply displays the current type and number of weapons on board your sub. No interaction is possible. The total of available weapons is updated as weapons and countermeasures are dispensed.

## KILO TACTICAL WEAPONS

Kilos in S.C.S. - *Dangerous Waters* have been assigned weapons capable of targeting surface ships, submarines and land targets. The Kilos also carry a shoulder SAM launcher for targeting helicopters and low flying maritime patrol aircraft. Available weapons are described briefly below. The Kilo loadouts vary by country and Hulls.

### Weapons on Russian and Chinese Kilos

**TEST-71M / TEST-71ME Torpedo:** This weapon can target submarines only. It has a maximum speed of 40 knots (74 km/h) and a maximum range of 20 km (10.8 nm). It carries a 205 kg (452 lb) warhead and is effective to a depth of 400 m (1,312 ft).

**53-65 K / 53-65 KE Torpedo:** This wake homing torpedo works best against surface ships, although it can also be used with limited success against submarines. It has a maximum speed of 55 knots, a range of 7.5 nm and carries a 300 kg warhead.

**SA-N-8 Gremlin SAM (All Russian Kilos and Chinese Improved Kilos):** Fired from a shoulder-launcher from a position in the aft of the sail, these Surface to Air Missiles have a maximum range of 4.7 km (2.5 nm), can reach a maximum altitude of 3,505 meters, and carry a 2 kg (4.4 lb) warhead. (Press [F8] when the Kilo is surfaced to access the SAM launcher.)

### Weapons on Russian Kilos Only

**SS-N-15 Starfish:** This primarily anti-submarine weapon flies as a missile on an assigned course then drops a UMG-T-1 Torpedo. In the game the torpedo begins homing as soon as it hits the water. The missile has a range of 19 nm (35 km). The torpedo it drops has a range of 8 km (4.3 nm) and a warhead of 100 kg. It can also be used against surface targets.

- ✓ **Note:** For successful in-game launch of the SS-N-15 Starfish missile Ownship depth must be between 50 and 150 meters. Ownship speed must be 6 knots or less.

**USET-80 Torpedo:** This multipurpose active/pассив homing torpedo has a maximum range of 20 km (10.7 nm) and a maximum speed of 50 knots (83-93 km/h). A maximum depth of 500 m (1,641 ft) is modeled.

### Weapons on Chinese Kilos Only

**SET-53 ME Torpedo:** While generally thought to be a passive weapon, there is speculation that the M version of this weapon may have incorporated pirated British MK 20 active/pассив technology. For gameplay purposes both active and passive capabilities are modeled for this weapon. Max depth in gameplay is set at 1,200 ft (365 m). A maximum range of 14 km (7.5 nm) and a maximum speed of 29 knots (54 km/h) are modeled for this torpedo.

**TEST-71ME-NK (All Kilo 636 hulls):** This torpedo can be used against surface and subsurface targets. It can be wire-guided, has both active and

passive acoustic modes and can wake home. It has a warhead of 205 kg (452 lb), can travel at speeds up to 40 knots, and has a maximum range of 20 km (10.8 nm.)

**SA-N-5 Grail SAM (All Kilo 877 hulls):** The shoulder-launched version of this weapon is modeled in *S.C.S. - Dangerous Waters*. The Grail has a maximum speed of 972 knots (1,800 km/h), can reach a maximum altitude of 7,800 ft (2,377 m) and has a maximum range 4.4 km (2.4 nm). (Press [F9] when the Kilo is surfaced to access the SAM launcher.)

**Klub-S Series:** Carried by the Chinese Improved Kilo Hull 368 only. These weapons are also seen in the game as the SS-N-27 series missiles carried by the Russian Akulas.

- ✓ **Note:** to successfully launch any of the Klub weapons Ownship depth must be at 100 meters or less and speed must be at 6 knots or less.

**3M-54E ASCM:** This missile resembles the American TASM. It has a range of 220 km (119 nm), is low flying and has a warhead of 200 kg. (Equivalent to SS-N-27 ASM.)

**91RE1 ASW:** In *S.C.S. - Dangerous Waters* this antisubmarine weapon drops a Type 40 torpedo that enables as soon as it enters the water. The missile has a range of 19 nm; the torpedo has a maximum speed of 65 knots, a range of 13 km (7 nm) and a 150 kg warhead. (Equivalent to SS-N-27 ASW.)

**3M-14E LAM (Land Attack Missile):** This weapon resembles the American Tomahawk. It has a ballistic trajectory and a range of 162 nm and carries a 400 kg warhead. This weapon is added for gameplay. It is not known if the land attack version of this weapon has been exported to China. (Equivalent to SS-N-27 LAM.)

## KILO STRATEGIC WEAPONS

### Mines

**Mobile Mine:** The Kilo's mobile mine is a modified version of the 53-65K torpedo. Launched via a 53 cm torpedo tube it can travel up to 18.5 km (10 nm) after leaving the ship. The mobile mine is effective in depths from 4 – 150 meters and has a 450 kg warhead.

### KILO COUNTERMEASURES

Countermeasures are defensive weapons used to prevent an enemy's torpedo from destroying your sub. The Kilo carries Active and Passive torpedo decoys that can be launched from the Fire Control Launch Panel, or via the Ownship or Orders Menus' *Countermeasure* option.

**Passive Decoy:** Used against passive homing torpedoes, this decoy emits sound (noise) across a broad spectrum of frequencies in an attempt to deceive the torpedo into homing in on the decoy.

**Active Decoy:** Used against active homing torpedoes this decoy is a bubble generator that creates an area of bubbles in an attempt to provide a false echo to the torpedo.

**Decoy Depth:** Decoys fired from the Fire Control Launch Panel are launched at Ownship Depth. Countermeasures fired via the Ownship or Orders Menus' *Countermeasures* option can be launched at either a Shallow (30 m) or Deep (244 m) depth.

## KILO WEAPON PRESETS

Presets are instructions that tell a weapon or UUV what to do. All presets are presented here alphabetically by weapon type. Not all weapons are available on every Kilo. See *Kilo Stations/Kilo Fire Control Suite/Kilo Tactical Weapons* for information on which weapons are carried on each class of Kilo.

### Antiship Missile Presets

#### 3M-54E Klub ASCM (Chinese Improved Kilo Hull 368 Only)

**Seeker Pattern:** Sets the area to be searched to either a wide or narrow pattern. This can be used to help discriminate against other shipping in congested waters.

⇒ Click the Wide/Narrow button to toggle the selection.

**Destruct Range:** Sets the range at which the missile self-destructs if a target is not encountered. Use this to avoid hitting neutral and friendly ships in the area. (Defaults to 50 nm.)

**Seeker Range:** Sets the range at which the missile begins to search. (Defaults to 0 nm.) This can be used to help discriminate against other shipping in congested waters.

- ✓ **Note:** Your ship must be at 100 meters or less and at 6 knots or less to successfully launch one of these antiship weapons.

### Mine Presets

#### Mobile Mine

Mines display the following presets:

**Define Target Waypoints:** Click **DEFINE TARGET WAYPOINTS** then click the Fire Control map to place a single waypoint.

**Latitude/Longitude:** Click the waypoint to display presets for setting the precise latitude and longitude for the waypoint. These coordinates define the final destination of the mine. Click the digits in the preset panel to set the desired value. You can also click a waypoint and drag it to the desired location. Watch the Latitude/Longitude readout in the lower left of the Fire Control map when dragging a waypoint to determine the waypoint's current location.

## Missile-Torpedo Presets

### SS-N-15 Starfish and 91RE1 ASW Missile

**Snapshot Bearing (deg):** The weapon is fired on the bearing entered here. This preset only appears if **Snapshot** is assigned to the tube from the Target drop-down list.

**Run To Enable:** Sets the distance (in meters) at which the missile drops its torpedo payload. The torpedo falls to the water and enables at once.

## Strike Missile Presets

### 3M-14E LAM

This missile has the following presets.

**Define Target Waypoints:** Click **DEFINE TARGET WAYPOINTS** then click the Fire Control map to place four waypoints for the weapon to follow.

**Destruct Range (nm):** Sets the range at which the missile self-destructs if a target is not encountered. Use this to avoid hitting neutral and friendly ships in the area. (Defaults to 50 nm.)

**Latitude/Longitude:** Once the waypoints are on the map the Lat/long presets appear. Click a waypoint to display presets for setting the precise Latitude and Longitude for the waypoint. Click the preset digits to increment the value. Right-click to decrease the value. You can also click a waypoint and drag it to the desired location. Watch the Latitude/Longitude readout in the lower left of the Fire Control map when dragging a waypoint to determine the waypoint's current location.

- ✓ **Note:** Your ship must be at 100 meters or less and at 6 knots or less to successfully launch one of these Land Attack Missiles.

## Torpedo Presets

### 53-65K, (53-65KE), SET-53ME, Test-71, (Test-71ME, Test-71ME-NK), USET-80

The following presets are available for torpedoes:

**Snapshot Bearing (deg):** The weapon is fired on the bearing entered here. (This preset only appears if Snapshot is assigned to the tube from the Target drop-down list.)

**Depth:** Set the depth at which the weapon travels.

**Ceiling:** Set the depth above which the weapon does not travel.

**Floor:** Set the depth below which the weapon does not travel.

**Acoustic:** Choose *Active* or *Passive* sonar mode. Active mode transmits active pings and follows the returns. In passive mode the weapon does a passive sonar search.

- ✓ **Note:** The 53-65K/53-65KE torpedoes are wake homers. They have no *Acoustic* setting.

**Run To Enable:** Set the distance the weapon travels before it enables and starts its active search. Enabling the weapon too soon can alert the target in time to take evasive measures. Enabling too late can mean the weapon runs past the target.

**Speed:** Set the speed at which the weapon travels.

## UUV Presets

**Use OS Depth:** Set the depth at which the UUV travels to that of Ownship. **Use Os Depth** is selected by default. Deselect the option to display the Depth option.

**Depth:** Enter the desired depth for the UUV to travel. Click a digit to increment the value. Right-click to decrease the value.

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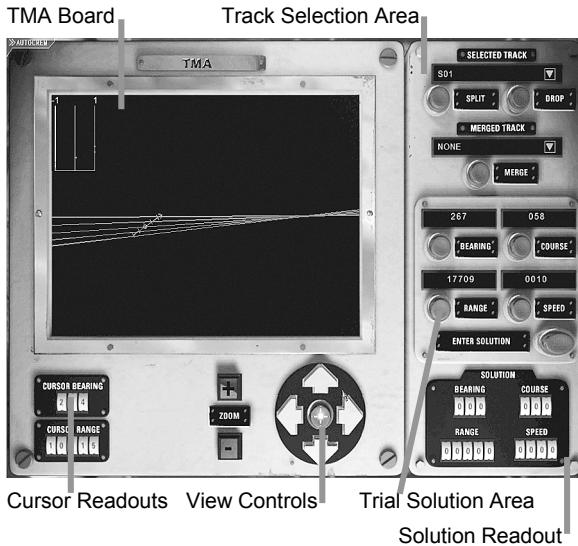
## KILO TMA STATION [F7]

At the Target Motion Analysis (TMA) station, data from the Kilo's sensors are used to determine a contact's bearing, range, course and speed. This information, called a target solution or simply a solution, is necessary to accurately target a contact with your ship's weapons.

Performing TMA is not easy and without at least a rudimentary understanding of TMA functionality it is highly unlikely that TMA can be performed successfully. Since the FFG and all submarine classes in S.C.S. - *Dangerous Waters* have a TMA station, the TMA basics are described just once in this manual. See *Training/TMA Basics* for information on how to perform target motion analysis. Refer back to that section while learning to perform target motion analysis at the Kilo's TMA station.

## KILO TMA STATION COMPONENTS

As with all TMA stations in controllable submarines, the Kilo's TMA station is composed of several distinct areas: The TMA board, the View Controls and Cursor Readouts, the Track Selection Area, Trial Solution Area and the Solution Area. These areas are described briefly below. See *Training/TMA Basics* for additional information about these areas.



## Kilo TMA Board

The board displays a representation of Ownership, a history of bearing data for a selected contact, a TMA ruler and an error dot stack. These tools are used to analyze sensor inputs.

### Bearing lines (LOBs)

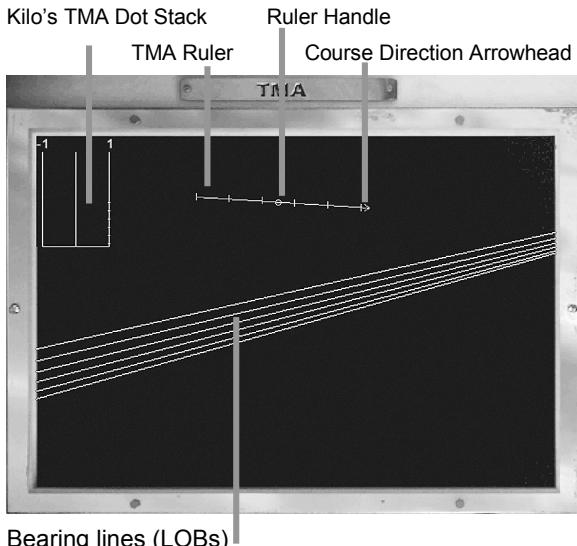
When a sensor sends a bearing report to TMA a history of each report is maintained. When a contact is selected the bearing report history for that contact appears on the TMA board. The lines extend indefinitely for contacts reported by sensors that report only a bearing. The ruler is found at the default range of 10,000 yards.

The ruler is found at the end of the LOB (the reported range) when it is reported by Active sonar, Radar or the Stadiometer. The color of the bearing lines indicates the sensor that is detecting it.

<b>Cylindrical (bow) array:</b>	White
<b>Conformal (hull) array:</b>	Blue
<b>Active sonar:</b>	Green
<b>Active Intercept:</b>	Yellow
<b>Periscope or ESM:</b>	Red
<b>Radar:</b>	Yellow
<b>UUV passive sonar:</b>	White
<b>UUV active sonar:</b>	Green

## Time History Right-Click Menu

Right-click the TMA Board to change the bearing return history on the TMA Board. As long as a tracker is tracking, bearing information is sent to TMA in two-minute intervals. If the screen gets too cluttered, change the number of lines that are displayed. History options available are 10 minutes, 20 minutes (default), 1 hour and 4 hours. A check mark indicates the selected option.



**Kilo TMA Board**

### The TMA Ruler

The TMA ruler is used to generate your best estimate of the contact's course and speed. Its location on the board relative to Ownship indicates your estimate of the range of the contact. With each new bearing line an additional tick mark is added to the ruler and another dot is added to the top of the dot stack.

The ruler components are described below.

- ❑ The arrowhead on the ruler indicates the *course* of the contact.
- ❑ The length of the ruler represents the current estimate of the contact's *speed*: the longer the ruler, the faster the estimated speed.
- ❑ The distance of the ruler from the Ownship marker represents the contact's estimated *range*.
- ❑ Each tick mark represents a specific interval of time. (Towed and Bow arrays update every two minutes while radar and continuous active sonar update with every sweep or ping.) The mark at the end of the ruler represents the initial or oldest information.

- The *estimated current bearing* of the contact is a point just ahead of the arrowhead. The *last reported bearing* is represented by the tick mark closest to the arrowhead.

- ✓ **Note:** All of the current estimates represented by the ruler appear in numerical form in the Trial Solution Area to the right of the TMA Board.

### Manipulating the Speed Strip Ruler

The speed strip ruler is adjusted as follows.

**Adjusting length and direction:** Click and drag the end mark or the arrowhead to adjust the length or direction of the ruler.

**Positioning Tick marks:** The tick mark closest to the arrowhead should be placed on the most recent bearing line. The end tick mark should be positioned on the initial or oldest bearing line.

**Using the Handle:** A circle appears at the center of the ruler when more than one tick is present and speed is more than zero. The circle acts as a handle. Click the handle and drag the entire ruler to another location. The handle maintains the current course and speed settings of the ruler and adjusts range and bearing.

**S.C.S. - Dangerous Waters Tip:** Center on the ruler and zoom in to better manipulate the ruler and access the handle. If you have difficulty dragging the ruler to get the arrowhead pointed in the desired direction, enter the desired course number in the course field.

### The Dot Stack

The dot stack in the upper left corner is a graphical representation of the error between tick marks and bearing lines. The dot at the top of the stack is associated with the most recent bearing line. Moving the ruler and adjusting the location of the tick marks allows you to line up the dots along the center vertical line in the dot stack. The analysis is probably most nearly correct when the top most dots are on the centerline. This process is called stacking the dots.

### Kilo Track Selection Area

The area at the upper right of the Kilo's TMA station is used to select a contact to analyze, merge, split or drop. These functions are described here.

**SELECTED TRACK** drop-down list: This dropdown lists the alphanumeric Contact IDs for designated contacts. Selecting a Contact ID from the list displays on the TMA board the available history of bearing lines for that contact. The first letter of the contact designation represents the source of the data: S for Sonar, R for Radar, V for visual (Periscope and Stadiometer), and E for ESM. M indicates a merged contact.

**SPLIT:** Click button to split the merged (M) contact selected in the SELECTED TRACK drop-down list into its two original contact components.

**DROP:** Click to permanently drops the contact selected in the Selected Merge: Click to merge the contact selected in the Selected Track drop-down list with the contact selected in the Merge Track drop-down list.

**MERGED TRACK:** This dropdown lists all contacts except the contact selected in the SELECTED TRACK drop-down list.

### **Kilo Trial Solution Area**

The area to the right of the TMA Board is used to create and fine-tune a firing solution for the selected contact and to enter the solution into the ship's fire control system.

**BEARING, COURSE, RANGE, and SPEED Fields:** Represent the trial solution for the selected contact. The current position and size of the TMA ruler is reflected in these fields. These numbers are altered by dragging and resizing the ruler or by entering values directly into these fields. The ruler moves to reflect the entered values.

**Lock Buttons:** Click the red button to the left of each field to lock the value in that field. The ruler reflects the locked value. An illuminated button indicates a locked value.

**ENTER SOLUTION:** Enters the values in the trial solution fields into the system. These values are now the system firing solution for this target. The NTDS symbol for this contact is located on the Nav and Fire Control maps at the designated bearing and range and moves on the course and speed entered here.

- ✓ **Note:** The ruler position for selected Contact A is not retained when you select Contact B unless a solution has been entered for Contact A prior to selecting another contact. That means that unless you enter your solution, the ruler you have carefully positioned on Contact A will be in a different position when Contact A is reselected. Don't lose your work. Enter your solution. You can always fine-tune it later.

### **Kilo View Control Area**

Other than the zoom controls the view controls are not labeled.

- ⇒ Click the red center on ruler button to place the ruler in the center of the TMA Board.
- ⇒ Click + to zoom in on the TMA Board view and – to zoom out.
- ⇒ Click the arrows to pan the view on the TMA Board.

### **Kilo Solution Area**

The TMA SOLUTION area in the lower right of the station displays the current solution in use by the Fire Control system for the selected contact. There is no user interaction in the TMA SOLUTION area. These fields

display zeros until you have clicked ENTER SOLUTION in the TMA Solution Input Area.

- ⇒ To change the solution in use by the system for the selected contact, alter the ruler to the desired position on the TMA board or enter numbers directly into the trial solution area fields, then click the ENTER SOLUTION button again.

## **TMA ON RADAR, ACTIVE SONAR, VISUAL CONTACTS**

Contacts marked in Active Sonar, Radar and the Stadimeter appear as a bearing/range pair on the TMA Board. The bearing line ends with a tiny triangle positioned at the range of the contact. If the target's bearing and range are known at two different times, as is the case with active sonar and radar, the solution can be found by connecting dots and 'drawing a line' with the ruler for course and speed.

A UUV in active mode provides returns from the location of the UUV in TMA and on the Nav and Fire Control maps.

- ✓ **Note:** Marking a contact with the periscope does not provide an automatic range. But using the Stadimeter to manipulate a photo of the visual contact can provide you with a range that is fairly accurate. See *Kilo Stations/Periscope-Stadimeter Stations/Kilo Stadimeter Stations*. When visual or periscope contacts are referred to in this section, it is assumed that you have determined a range for the contact and marked it in the Stadimeter Station. The Periscope and Stadimeter Stations work hand in glove.

### **To determine a target solution for Active Sonar, Periscope or Radar Contacts:**

1. Select a Contact ID from the SELECTED TRACK dropdown list.
- Radar contacts have an R designation, visual contacts have a V designation, active sonar contacts have an S designation the same as passive sonar contacts.
- A bearing line appears on the TMA board. A tiny triangle at the end of the bearing line indicates the target's range at time the contact was marked.
2. After a short interval return to the Active Sonar or Radar Station (whichever you are using) and mark the contact again. (When ON Radar Autocrew automatically marks contacts as long as the Radar is radiating.)
  - ⇒ For visual contacts, take another photo of the contact from the periscope and manipulate it in Stadimeter, then mark the contact again from the Stadimeter Station.
  - ⇒ Continue to mark the contact at two-minute intervals to accumulate several bearing lines. Toggle back and forth between the TMA and your chosen sensor.

3. Adjust the view on the TMA Board to get a clear view of the ruler and the range triangle.
  - ⇒ Move the ruler to the location of the range triangle, click the red button at the center of the display control arrows to center the ruler in the TMA Board, and then click the zoom buttons to better adjust the view. If you lose site of the ruler, zoom all the way out or click the red center on ruler button again.
4. Drag the arrowhead or tail of the ruler to adjust the tick marks along the bearing lines until the dots line up in the dot stack indicating a good solution.
5. Click the ENTER SOLUTION button to send the trial solution to the Fire Control system.

## **TMA ON PASSIVE SONAR AND ESM CONTACTS**

Determining a plausible solution is more complex when only a bearing is known, as is the case with passive sonar and ESM contacts. It takes more time and changes to Ownship course may be necessary to determine an accurate solution.

Passive sonar contacts with assigned trackers are updated automatically on the TMA board. ESM contacts must be updated manually by repeatedly marking the contact at the ESM Station. Contacts detected by a UUV in passive sonar mode are displayed on a LOB from the location of the UUV on the TMA board and in the Nav and Fire Control maps.

### **To perform TMA on passive sonar contacts:**

1. Select a Contact ID from the SELECTED TRACK dropdown list. The ruler appears at the default range of 10,000 yards on the most recent LOB with the arrowhead facing Ownship (or the UUV sensor if it is a UUV contact) with a default speed of 10 knots. These default values appear in the trial solution fields directly to the right of the TMA board.

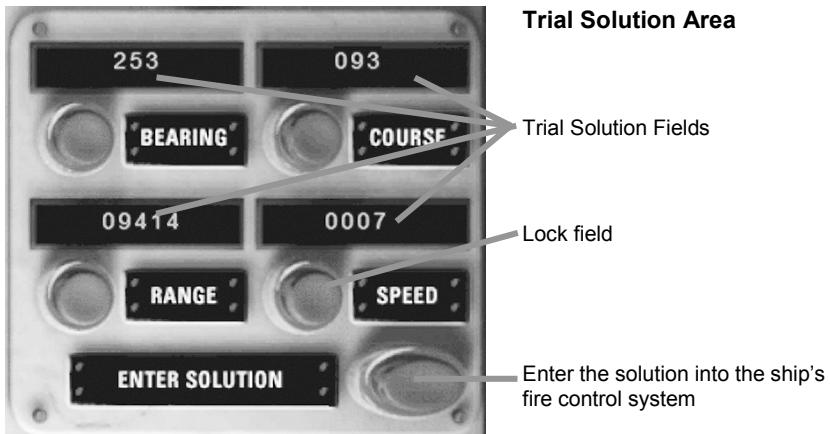
✓ **Note:** No contacts appear in the drop-down lists if no contacts have been designated. Link contacts do not appear in the TMA track list.

2. Adjust the ruler position to estimate the contact solution.
  - ⇒ Position the end tick of the ruler on the oldest bearing line. (The end tick is on the oldest bearing line when the bottom dot is on the centerline of the dot stack.)
  - ⇒ Click the red button at the center of the view control arrows to center the ruler in the TMA Board, and then click the zoom buttons to better adjust the view.
  - ⇒ If you lose site of the ruler, zoom all the way out or click the red center on ruler button again.

✓ **Note:** The circular ruler handle is only visible when the ruler contains more than one tick mark or a speed of greater than 1 knot (kt) is set in the Speed field in the trial solution area. You must zoom way in on

the ruler to see it at that speed. You can also set the speed to 10 knots or more temporarily. This will expand the ruler and reveal the handle.

3. Enter any known data in the trial solution fields.
  - ❑ If you have additional data on the contact's range, or course, for example from an intelligence message, enter it in the appropriate solution field. If you have determined the contact's speed using DEMON, enter that speed in the speed field. See *Kilo Stations/Kilo Sonar Suite/DEMON Sonar Station*. Click the digits to cycle through the values.
  - ❑ If you are sure about one aspect of the solution (e.g. range) enter that value directly into the Range field then lock the field. That keeps you from dragging the ruler to a different range.
  - ⇒ To lock a field, click the red button associated with the field. Lock buttons are located to the right of each trial solution label. These buttons are lit when the field is locked.



4. Adjust the ruler on the display until the tick marks align well with the contact bearing lines and the dots appear to line up along the centerline of the dot stack.
  - ⇒ Click the handle in the middle of the ruler to drag the entire ruler.
  - ⇒ Click and drag on either end of the ruler to move just that end or to adjust the length of the ruler.
5. When a good match between the tick marks, the bearing lines and the dot stack has been achieved, click ENTER SOLUTION to send this information to the Fire Control system. The system tracks the estimated position of the contact based on this system solution and uses that estimated location when targeting the contact.
  - ❑ The entered system solution displays in the SOLUTION panel at the lower right of the TMA station. To update the contact's system

solution, adjust the ruler or directly input information in the trial solution fields and click ENTER SOLUTION again.

6. Change Ownship's course and/or speed to refine the TMA solution. After steadyng on the new course and/or speed, adjust the ruler to achieve the best fit.
  - ❑ If one TMA solution does not fit the entire observed bearing data, consider the fact that the contact itself may have changed course and/or speed (a contact "zig".) Attempt to achieve a better fit of the ruler by disregarding some of the earlier bearing lines and looking only at recent bearings.

## Merging, Splitting and Dropping Contacts

If the same contact is tracked by more than one sensor (e.g., a contact tracked by passive sonar and radar), the data can be merged into a "master" contact. (Master contacts have alphanumeric designations that begin with the letter M.) This can be very useful if you have a good range from one sensor (radar or active sonar) and a good bearing history from another (passive sonar).

1. Click the SELECTED TRACK drop-down and select the one of the contacts to be merged.
2. From the MERGED TRACK drop-down select the track to be merged with the contact selected in the SELECTED TRACK drop-down list.
3. Click the MERGE button.
  - ⇒ To undo a merge, select the master contact (e.g. M01) from the SELECTED TRACK drop-down list and click the SPLIT button.
  - ⇒ To drop the selected contact altogether, click the DROP button. Dropping a contact cannot be undone.

✓ **Note:** If the TMA Autocrew is activated, he does everything for you. You can make no TMA inputs yourself. For more information on see *Kilo Stations/Kilo Autocrew/TMA Autocrew* at the end of this section.

## TMA ON UUV SENSOR CONTACTS

In S.C.S. - *Dangerous Waters* all controllable submarines can carry Unmanned Underwater Vehicles (UUVs). These UUVs have sonar capabilities only and cannot launch weapons. For information on launching UUVs see *Kilo Stations/Kilo Fire Control Suite/Deploying And Wire-Guiding UUVs*.

The lines of bearing for contacts detected by a UUV are drawn from the location of the UUV at the time of the report, not from Ownship's location. TMA on UUV contacts is performed as for any other sonar contact in active or passive mode.

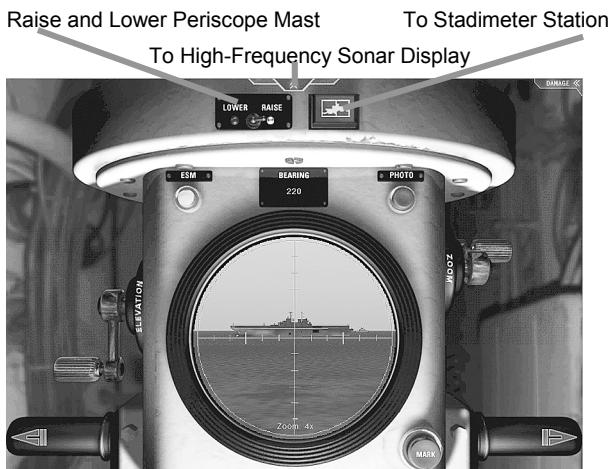
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## PERISCOPE-STADIMETER STATIONS [F8]

The Kilo Periscope Station in S.C.S. - *Dangerous Waters* merges the functionality of the Periscope with that of the Stadimeter and also provides access to the High-Frequency Sonar Display, which is useful for navigating minefields.

The Stadimeter is only accessible from the Periscope Station.

- ⇒ Click the Stadimeter icon button to the right of the mast switch to move to the Stadimeter Station.
- ⇒ Click the transition button at the top of the screen to move to the High-Frequency Sonar Display.



### DETECTING CONTACTS WITH THE PERISCOPE

1. Ensure the ship is at periscope depth (19 m) or shallower and at 10 knots or less if the sail is submerged.
2. Click on the right side of the RAISE switch to raise the periscope.
3. Rotate the periscope to look for contacts. Click the grey arrows on the left and right periscope handles, or click and drag in the periscope view to rotate the periscope 360°.
4. Make use of the periscope's ESM sensor as you rotate the scope. This sensor can alert you to the presence of a contact before you can see it in the periscope view. The ESM indicator light flashes when a radar emitter is detected. The intensity of the associated sound is an indication of the strength of the signal.
5. Zoom and adjust your view. Center the view on the contact of interest. Zoom in and adjust the elevation as needed.

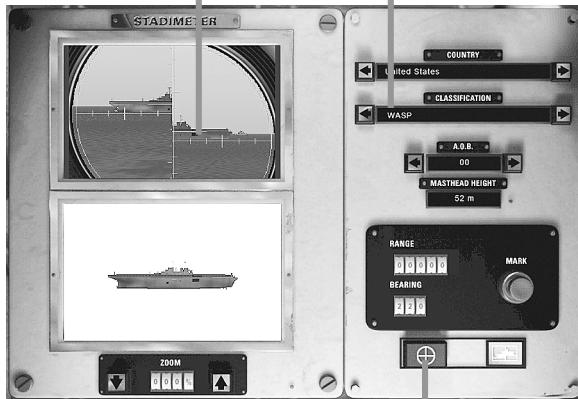
- ⇒ Click the upper half of the Zoom crank to zoom in. Click the lower half of the crank to zoom out.
- ⇒ Click the upper half of the Elevation crank to lower the elevation. Click the lower half to raise it.

6. With a contact centered in the periscope reticule click **MARK** to assign it an alphanumeric designation and send the bearing information for the visual sighting to the Target Motion Analysis station and the Nav Map. Visual contacts have a V designation. (V01, V02 etc.)
7. Center the contact in the middle of the periscope view. Align the horizontal line with the waterline before you take the picture. Click the **PHOTO** button to send a photo of the contact to the Stadimeter.

## KILO STADIMETER STATION

The Stadimeter Station is accessible only from the Periscope Station by clicking the Stadimeter icon button. The Stadimeter is used to manipulate a photo of a contact taken through the periscope to determine the contact's **range**. The Stadimeter can also be used to compare the photo to the ship's database of ship silhouettes to **determine its class** and **course**.

Click and drag to manipulate photo      Class of Silhouette



To Periscope Station

### Determining Course with Stadimeter

1. Take a photo of a contact in the Periscope Station [F9].
2. Click the Stadimeter button to the right of the Periscope mast switch.
- When the Stadimeter Station appears, the last photo taken through the periscope appears in the upper window.
- Names of ship classes that are close in length to the photographed contact are can be selected one at a time and their silhouettes viewed and rotated in the Silhouette Window.
3. Click the right and left facing arrows on either side of the COUNTRY and CLASSIFICATION fields to display ship silhouettes for classes of

similar length in the lower window. When a match is determined, leave the selected name in the CLASSIFICATION field.

4. Rotate the silhouette by clicking the A.O.B. arrow buttons to closely match the aspect of the ship in the photo to help match the silhouette to the photo. Matching the aspect provides the Angle on the Bow (AOB) needed to determine the contact's course. Course is a piece of information needed in developing a firing solution in TMA.
5. Determine the reciprocal of the bearing to the contact shown in the Bearing readout. (If the value in the bearing readout is 0 to 180, **add** 180. If the value in the Bearing readout is 180 to 360 **subtract** 180.)
6. If the contact has a **port** aspect, **add** the number in the AOB window to the reciprocal. If the contact has a **starboard** aspect, **subtract** the number in the AOB window from the reciprocal.
7. If the resulting number is **greater** than zero and **less** than 360, this number is a good approximation of the course of the contact.
  - If the number is **greater** than 360, **subtract** 360. The resulting number is a good approximation of the contact's course.
  - If the number is **less** than zero, **add** 360 to it. The resulting number is a good approximation of the contact's course. Enter that number in the Course field in TMA when this contact is selected.

### **Determining Class/Range with Stadimeter**

1. Click the Country arrows to select the desired Country.
2. Click the arrows on either side of the CLASSIFICATION field to cycle through possible class matches in the selected country's order of battle. A 3-D silhouette of the selected ship class appears in the Silhouette window.
3. Rotate the silhouette model by clicking the A.O.B. arrows. Click the Zoom buttons to alter the size of the silhouette in the window. When a match is determined, leave the selected name in the CLASSIFICATION field.
4. Click the side of the photo containing the contact's highest mast and drag that side of the photo such that the top of the highest mast is even with the waterline on the other half of the photo. The estimated range to the ship is displayed in the Range readout.
5. Click MARK. This sends the contact's bearing and range to TMA and the Nav Map.
- The class name showing in the Stadimeter CLASSIFICATION field when the contact was marked is assigned to the contact.

✓ **Note:** The photo must be manipulated to determine the contact's range before the contact is marked in Stadimeter or no contact is created on the Nav Map and no range is sent to TMA.

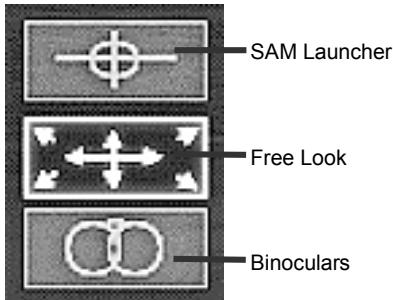
6. Click the Periscope icon button to return to the Periscope Station.

- ✓ **Note:** The **Kilo High-Frequency Sonar Display** is accessed via the screen transition button at the top of the screen. See *Kilo Stations/Kilo Sonar Suite/Active Sonar Station/Kilo High Frequency Active Sonar* for information on using the HFAS to navigate minefields.

## KILO SAIL BRIDGE (SAM LAUNCHER) [F9]

The Sail Bridge is only accessible when the Kilo is surfaced. The Sail Bridge provides three views: Free Look, Shoulder Mounted SAM Launcher and Binoculars.

⇒ Click the desired icon button to switch to that mode.



**Free Look:** The default view in the Sail Bridge provides a 360° naked-eye view of the area. Click and drag to pan the view.

**Binoculars:** Zoom to 8X by clicking the thumb wheel at the top of the screen. Click and drag to pan the view. VISUAL mode is selected by default. LLTV mode is available for night vision.

**SAM Launcher:** The Kilos carry either an SA-N-5 Grail Launcher or an SA-N-8 Gremlin SAM launcher to attack helicopters and low flying airplanes. The SAM launcher view provides a first-person shooter aspect to engage aircraft within range:

SA-N-5 Grail: Max Range: 4.4 km (2.4 nm); Max Altitude: 7,800 ft (2,377 m)

SA-N-8 Gremlin: Max Range: 4.7 km (2.5 nm); Max Altitude: 11,500 ft (3,505 m)

### LAUNCHING SURFACE TO AIR MISSILES

1. Surface the ship.
2. Press [F9] to access the Sail Bridge. This button is not enabled until the ship is on the surface or the sail is mostly exposed.
3. Click the SAM Launcher icon button.
4. Click and drag in the view to position the reticule on the target.
5. The interior Target Indicator bars turn red when there is a valid target centered in the reticule. Right-click to fire the weapon. It automatically reloads.

✓ **Note:** If you submerge the ship or heavy seas submerge the sail for long periods of time, the view moves to the Nav Map. The Sail Bridge is not accessible until the ship resurfaces.

## KILO AUTOCREW

The Kilo has five Autocrew who perform parts of or all tasks at given stations. The Autocrew available on the Kilo are described below.

### KILO BROADBAND/NARROWBAND SONAR AUTOCREW

When ON, the Broadband/Narrowband Autocrew searches Narrowband for contacts. Because they share trackers, contacts marked in Narrowband also display in Broadband. He also assigns trackers, classifies all marked contacts in Narrowband and assigns a Low, Medium, or High level of confidence in his classification. The level of confidence displays in the Navigation Station's DDI and above the 3D model when that contact is selected.

**Low level of Confidence:** Crewman has narrowed the possible classes to 4 or more and picks one at random.

**Medium Level of Confidence:** Crewman has narrowed the possible classes to 2 or 3 and picks one at random.

**High Level of Confidence:** Crewman has narrowed the possible classes to one.

When the Broadband/Narrowband Autocrew is ON you can still mark contacts yourself and select different arrays and contacts for the crewman to analyze.

- **On the Nav Map:** Each contact marked by your Sonar Auto Crewman appears on the Nav Map as a colored line of bearing ending with a symbol. This is usually the symbol for Unknown (platform/category)/Unknown (ID) and is accompanied by its contact designation number (S01, S02, etc). As soon as your Sonar Auto Crewman has classified the contact, the symbol changes to that of the specified class. (See *Navigation Station/2D Navigation Map/NTDS Symbols*.) Clicking on the contact designation displays information about the class in the DDI and the 3D model of that class appears in the 3D view surrounded by a bounding yellow bounding box and a level of confidence bar.
- **Your task:** Your Sonar Auto Crewman can classify a contact as a specific class, but he cannot determine its ID (alliance). You must do that yourself on the Nav Map.
  - ⇒ On the Nav Map, right-click the contact's symbol to display the Contact Menu.
  - ⇒ Select *Designate Category/ID>ID* and drag your cursor to select the presumed alliance ID for the contact.

## KILO SONAR ACTIVE INTERCEPT AUTOCREW

When ON this Autocrew marks all contacts detected in Active Intercept. You have no additional responsibilities in this station when Active Intercept Autocrew is on. The Autocrew does not prevent you from marking contacts.

## RADAR AUTOCREW

You must raise and lower the radar mast. When ON, your Radar Auto Crewman performs the following task as long as the radar is on:

- Marks contacts and re-marks them every minute that the contact can be detected. Contact range and bearing is sent to TMA and is reported on the Nav screen DDI when that contact is selected.
- Note:** The Radar Auto Crewman is not speedy. It takes a minute or two before he begins to mark contacts. When Radar Autocrew is ON, you cannot move the Radar cursor.

## FIRE CONTROL AUTO CREWMAN

When ON the Fire Control Autocrew performs the following duties:

- Uses information sent from the TMA station to establish presets for the selected weapon that are appropriate for the designated target.
- Your Task:** It is still your responsibility to select a target, assign a tube, and fire the weapon from the Fire Control Launch Panel or by using the Contact Menu's *Engage With* command from the Nav Map. Your Fire Control Autocrew uses the contact's classification when determining presets. If you classify a contact as a surface ship when in actuality it is a submarine, your Auto Crewman enters presets appropriate for a surface ship.
- Note:** When the Fire Control Autocrew is ON you can set only Snapshot bearings and place waypoints in the presets. All other presets are greyed out.

## KILO TMA AUTOCREW

Accurate TMA takes time. Your TMA Auto Crewman requires data from several sensors and/or a change in Ownship's course to generate an accurate firing solution. When ON, the TMA Autocrew performs the following duties:

- Uses information reported from all sensors to determine a firing solution. This solution is his best estimate of the course, bearing, range and speed of a contact.
- Merges contacts that represent the same track reported by different sensors.
- Keeps track of the movement of each contact and updates the solution on the Nav and Fire Control Maps with every new sensor input. The solution is updated immediately with his best guess whenever a contact is selected from the drop-down list in the TMA station.

- Once the Autocrew enters a solution for a contact, the contact then appears as a symbol on the Nav Map at the designated range and bearing and the solution is also sent to Fire Control for use in targeting. The symbol for Unknown (platform category)/Unknown (ID) is displayed until you or the Sonar Auto Crewman classifies it.
- The Nav Map symbol for the contact moves on the map according to the course and speed set in the solution.

✓ **Note:** When TMA Autocrew is on, you can select specific contacts to view on the TMA board, but you are not able to manipulate the ruler or the settings.



# *SECTION 11*

# *AKULA STATIONS*



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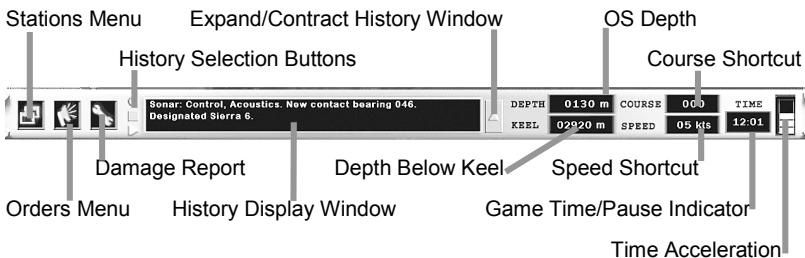
## 11: AKULA STATIONS

All Akulas regardless of country or version have the same stations and station functionality in S.C.S. - *Dangerous Waters*. The Akulas differ in noise generation and in weapons loadout. Both the Akula-I Improved and the Akula-IIs are referred to in this manual as Akula.

- ✓ **Note:** The default view when entering a mission is the Navigation Station. The Navigation Station with its 2D Nav Map and 3D view functions the same on every controllable platform and is covered only once in the manual. See *Navigation Station*. Some Nav Station information unique to the Akula is contained in the abbreviated *Akula Navigation Station* section later in this section.

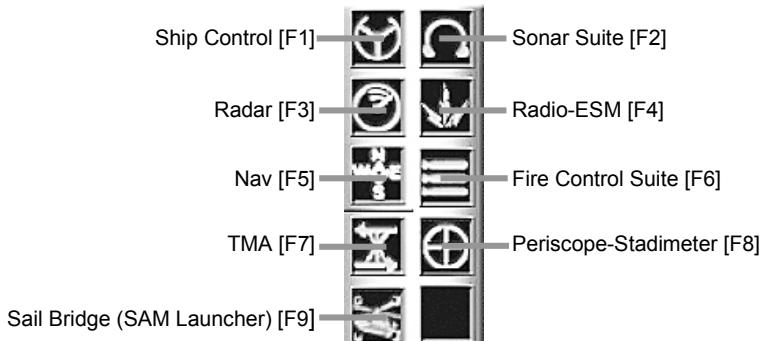
### AKULA TASK BAR

The Task Bar for all submarines functions the same. Differences are cosmetic. The Akula Task Bar appears below.



### AKULA STATIONS MENU

Click the Stations Menu button to expand the selection menu. Select an icon to jump to that station or use the appropriate function key.



## AKULA ORDERS MENU

**Navigate:** Select various navigation orders.

**Set Depth:** Displays a menu orders of depth shortcuts

**Surface:** Orders a normal surfacing of the sub.

**Go to PD:** Orders OS to Periscope Depth (20 meters).

**Go Shallow:** Orders a depth of 51 meters.

**Go Deep:** Orders a depth of 442 meters.

**Go to Snorkel Depth:** Orders a depth of 18 meters.

**Change Speed:** **Change Speed:** Displays a submenu of engine order shortcuts. Given no strong currents in the area, selecting one of the following commands results in the indicated speed:

**All Ahead Flank:** Maximum speed for platform (Max submerged speed: Akula-I Improved: 33 knots; Akula-II 35 knots)

**All Ahead Full:** 20 knots.

**Ahead Standard:** 15 knots.

**Ahead 2/3:** 10 knots.

**Ahead 1/3:** 5 knots.

**All Stop:** Orders OS to a full stop.

**Back 1/3:** 4 knots in reverse.

**Back 2/3:** 8 knots in reverse.

**All Back Full:** 12 knots in reverse.

**All Back Emergency:** 16 knots in reverse.

**Arrays/Wires:** Displays a submenu permitting you stream, retrieve or stop the winch deploying the Towed Array and the Floating Wire.

**Masts and Antennas:** Raise masts individually or lower all at once. Raising the masts while submerged can damage them if OS speed exceeds 8-10 knots. See *Appendix C: Submarine Max & Mins* for information on safe speeds for extending each mast while submerged. The Snorkel Mast is only available when at snorkel depth (18 meters) or shallower. Raising the mast initiates ventilation. The ventilation process is secured from this menu or from the Ship Control Station via the VENT button, automatically lowering the mast.

**Autocrew:** Displays a submenu of Autocrew options. Selecting an option toggles its state. A checkmark indicates that the Autocrew is ON. See *Akula Stations/Akula Autocrew* for a full description of Autocrew functionality.

**Fire Tube:** This menu option only appears when there is a weapon loaded in a tube and ready to shoot. Weapons are loaded in the Fire Control Launch Panel and presets determined in the Fire Control Target Display.

**Countermeasures:** Launch either active or passive decoys. From the Orders Menu a depth of shallow (30 meters) or deep (244 meters) can be selected.

## DAMAGE REPORT WINDOW

Lists damage to any station. The text scrolls as necessary. When a station has damage, the damage indicator in the upper right of a station slides out to reveal a wrench. When the wrench is present on a screen, check the Damage Report Window for more specific information on the time required to repair the damage or notification that the damage cannot be repaired. Be aware that parts or all of a station will not work when damage has occurred.

⇒ Click the wrench button in the Task Bar to open/close the window.

## HISTORY WINDOW

Displays the type of history selected by buttons to the left of the window. The newest report appears at the bottom of the scrolling list.

**History Selection Buttons:** A lit button indicates the currently selected History type. If there is a new message in any other window, that window's selection button flashes until that button is selected.



- Crew Report History: Lists all orders as acknowledged by crewmembers.
- Radio Traffic History: Lists all radio messages received.
- Multiplayer Chat History: Displays a history of multiplayer chat messages.

## MANEUVER SHORTCUTS AND GAME READOUTS

**DEPTH:** Keel depth reported in meters. Click/right-click digits to order a depth change.

**KEEL:** Readout of the depth of water below the keel in meters.

**SPEED:** In knots. Click/right-click digits to order a speed change. You cannot enter a speed that exceeds maximum speed for the class.

**COURSE:** Current course in degrees. Click/right-click digits to enter a new course.

✓ **Note:** Be aware that currents affect Ownship course and speed. It may not be possible to achieve the order course or speed if the currents are strong. Currents can be turned off/on in the *Options>Game* page prior to mission start.

**TIME:** Displays the time of day in the mission based on a 24-hour clock. When the game is paused, the time display is replaced by the word PAUSED.

⇒ Press [P] to pause the game. Press [P] again to resume the game.

- ⇒ Click the numbers in the Time display to pause the game. Click PAUSED in the time display to restart the game.

## TIME COMPRESSION SCALE

In addition to real time, S.C.S. - *Dangerous Waters* supports four levels of time compression. The time scale displays in the far right of the Task Bar. A stack of colored bars represents the level of time compression.

- At real time, a single green bar is displayed.
- At twice real time a lime (yellow/green) bar appears above the green bar.
- At four times real time a yellow bar is added to the stack.
- At eight times real time an orange bar is added.
- At up to sixteen times real time (depending on system capability) a red bar appears at the top of the stack.

⇒ Press [.] (period) or [.] (comma) or click/right-click on the scale to toggle through all the time scales

 **NOTE:** Time compression is not available in Multiplayer missions.

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## AKULA SHIP CONTROL STATION [F1]

The Akula's Ship Control Station features are described below.

**AIR REMAINING:** Indicates the charge level in the high-pressure air banks.

**AIR: CHARGE:** Initiates a charge of the high-pressure air banks. The charge can be increased by only 10% when the ship is submerged. You must ventilate to fully charge the banks. A minimum charge level of 50% is necessary to successfully launch weapons.

- ⇒ Click the CHARGE button to commence charging the air banks. A red light surrounding the button indicates the charge is in progress. Click again to secure the charge.

**AIR: VENT:** (Ventilate) In order to fully charge the high-pressure air banks you must be at snorkel depth (18 meters) or shallower and ventilating as well as charging.

- ⇒ Once at snorkel depth, click the VENT button. The button is ringed in red when ventilating is in progress. Click the VENT button again to secure ventilation. The snorkel mast lowers automatically.

**TRIM ANGLE:** Indicates the trim angle of the ship measured from a horizontal axis. A positive trim angle indicates that the ship has a bow-up attitude. A negative trim angle indicates a bow-down attitude. Your helmsman automatically controls the trim angle whenever you order a depth change.

**TOWED ARRAY:** The Akula has one towed sonar array. The length of the array currently deployed is displayed in the LENGTH readout. The Akula's towed array is fully deployed at 304 meters (approximately 1000 feet).

- ⇒ Click STREAM to deploy the towed array. Click OFF to stop streaming. Click RETRIEVE to retrieve the towed array.

**MBT VENTS:** When on the surface, click OPEN to open the main ballast tank vents and submerge the ship. The vents close automatically once the ship is submerged and cannot be opened again until the ship has resurfaced.

- ✓ **Note:** The sub dives/surfaces automatically when an appropriate depth change is ordered by means of the taskbar depth shortcut, the ORDERED DEPTH window from the Ship Control Station, or by means of an Order's Menu *Navigate>Set Depth* option. It is not necessary to manually open the MBT Vents.

**COURSE:** On this Course Indicator, the red needle indicates current course. The grey needle indicates ordered course.

- ⇒ Click the desired heading on the Course Indicator to order that course.

**ENGINE ORDER:** The Engine Order Telegraph orders engine speed. See *Akula Stations/Task Bar/Orders Menu* for more information. Flank (maximum) speed for the Improved Akula-I is modeled at 33 knots. Flank Speed for the Akula-II is modeled at 35 knots.

- ⇒ Click the desired option to order that Engine Speed.

**DEPTH:** Actual and ordered depth is shown here in meters.

- ⇒ Right/left click the digits in the ORDERED field to order a new depth.

**SPEED:** Actual and ordered speed is shown here in knots.

- ⇒ Right/left click the digits in the ORDERED field to order a new speed.

**PLANES:** The bow and stern planes and the rudder move automatically when you change depth but you can control the Rudder if you so desire.

- ⇒ Click the desired number in the Rudder Indicator to order a Rudder change. The grey needle indicates the ordered rudder position. Orange the actual position.
- ⇒ Click **0** in the Rudder indicator or click in the Course indicator to reset the rudder.

- ✓ **Note:** The ship will eventually turn in a circle if you do not reset the rudder to zero or order a specific course.

**SOUNDING:** This readout shows the depth under the keel in meters.

**EMERGENCY BLOW:** Blows high-pressure air into your ballast tanks to emergency surface your ship. Remember to recharge your air banks following an Emergency Blow.

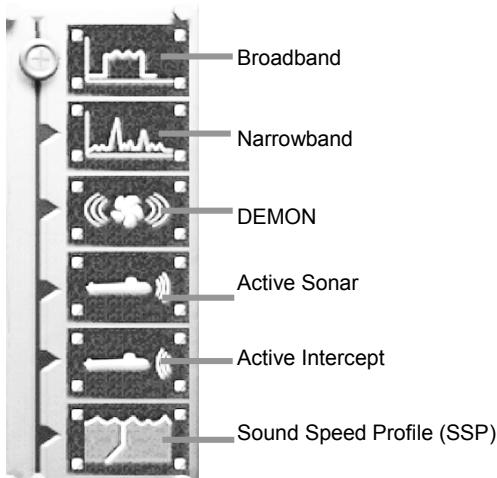
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## AKULA SONAR SUITE [F2]

See *Training/Sonar School* for sonar information needed to efficiently use the sonar stations.

At the Sonar Stations you monitor the most important sensing equipment on board your submarine. Six displays, each with a specific purpose, help detect, identify, track, and localize contacts by employing either active or passive sonar. The sonar suite is composed of these six displays: Broadband, Narrowband, DEMON, Active, Active Intercept, and Sound Speed Profile (SSP). All six stations are explained in this section. For information about UUV (Unmanned Underwater Vehicle) sensors and their use see *Akula Stations/Akula Fire Control Suite/Deploying and Wire-Guiding UUVs*.

On all sonar stations six buttons are always visible and permit you to navigate between Sonar Stations.



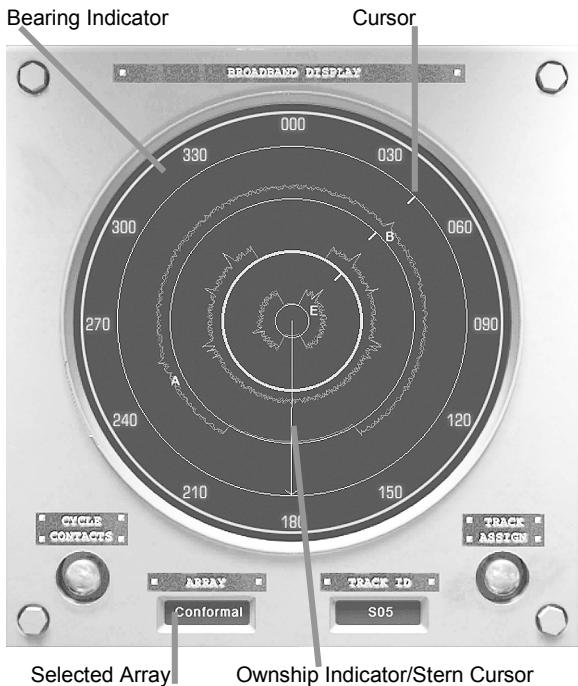
### AKULA BROADBAND SONAR STATION

The Broadband Sonar Station displays input from the cylindrical bow, conformal and towed arrays. These inputs are used to detect and track submarines and surface ships. Here trackers can be assigned to contacts and they are given an alphanumeric Contact Designation or ID. Contact IDs for all sonar contacts begin with the letter S. Trackers provide the TMA station with updates on the contact's bearing at specified time intervals.

- ✓ **Note:** UUV sonar contacts also have Sierra (S) designations, but their data are not reported in the Sonar Suite. UUV returns are available in TMA and on the Nav and Fire Control maps.

## Akula Broadband Circular SSAZ Display

The broadband display in the Akula is circular and represents Signal Strength versus Azimuth (SSAZ). The SSAZ display consists of concentric bands extending from an inner circle. Each band represents data from a different ship sensor.



### Akula SSAZ Display

Data from three sensors are reported on the Akula's SSAZ display. The innermost band, displays contacts detected on the conformal array. The second, or middle band, displays towed array contacts while the outermost band displays contacts on the cylindrical array.

- ✓ **Note:** In the Akula's the towed array must be deployed before any contacts can appear in the Towed Array band on the SSAZ Display.

The 360-degree Bearing Indicator rims the outer edge of the Circular Display. A narrow jagged ring near the inner edge of each band indicates background noise on that sensor. Contacts on the arrays appear as spikes emerging from the background noise at a specific bearing and extending

toward the outer edge of the band; the stronger the signal, the taller the spike.

Clicking inside a specific band selects that array. The outer edge of that band brightens and enlarges slightly indicating that the band and the array it displays are selected and the name of the selected array appears in the Array window.

On the SSAZ Display, a thin line extending from the center to the outer edge represents Ownership. The line ends with an arrow indicating the direction Ownership's stern is pointing.

Each sensor display has its own cursor. A cursor appears as a short line extending into the array from each array's outer edge. Click inside the array to move the cursor to that location on that array's bearing indicator or click the cursor and drag it to a new location. The cursor is used to identify the contact you want to mark.

Ship speed greatly interferes with the ability of the Akula's sensors to detect and display contacts. Excessive speed results in the inability to detect any contacts at all. Only background noise is visible and that appears as a thick, jagged band at the outer edges of each array.

## **Assigning Trackers**

1. Click inside the desired circle to select that array. Outer ring: Cylindrical array, Middle ring: Towed array, Inner ring: Conformal array.
2. Click the desired contact spike. A vertical cursor appears on the bearing indicator. You can click and drag this cursor along the bearing indicator.
3. Click a spike extending toward the outer edge of the selected array.
4. Click TRACK ASSIGN to designate the target and assign a tracker. (If the signal is faint, you may have to click more than once.)

A tracker letter is placed below the spike. Four trackers are available for each sonar array.

**A, B, C, and D:** Assigned to Cylindrical contacts.

**E, F, G, and H:** Assigned to Conformal contacts.

**I, J, K, and L:** Assigned to Towed array contacts.

If the cylindrical array already has four contacts assigned to trackers (A-D) and you designate a new contact, the oldest tracker is unassigned from its current contact and reassigned to the new contact. This is also true for the hull and towed arrays. To unassign a specific tracker, click on the letter and drag it into the Display and release it. (This can be tricky.)

## **Towed Array Contacts**

Unless the towed array is deployed no contacts appear in the Towed Array Display. Towed array contacts do not appear immediately when the array is

deployed. If the towed array is not already deployed at mission start, stream it from the Ship Control Station [F1] or from the Task Bar's Orders Menu using the Arrays/Wires option.

Because of the physics of the towed array construction, an ambiguous contact, a mirror image of each true contact, appears on the display along with the true contact. If you have a contact at a bearing on your bow array, you can be fairly certain a contact at the same or nearly the same bearing on your towed array display is on the contact's actual bearing.

If the contact is not visible on another array, changing the course of Ownship allows you to determine which bearing is the actual and which is its mirror image on the display. After you maneuver, one contact remains at a consistent bearing and one appears to move in the display. The contact's actual bearing is that of the contact that remains constant.

- ✓ **Note:** Be aware that when you turn Ownship your towed array does not begin to turn until it reaches the point in the ocean where the ship began its turn. As a result, Ownship appears as a contact on the towed array during turns.

## ***Akula Broadband Station Components***

The buttons, fields and other components of the Akula broadband station are described below.

**BROADBAND DISPLAY:** This circular Signal Strength versus Azimuth display (SSAZ) shows contacts from the Akula's cylindrical, towed and conformal arrays and allows for marking these contacts. See *Akula Stations/Akula Sonar Suite/Akula Broadband Circular SSAZ Display* for a description of the display and information on assigning trackers in this display.

**AUDIO:** Toggles Contact Sound ON and OFF. When ON placing the cursor on a contact in the SSAZ display emits only the sound generated by that contact. Defaults to ON.

**TRACKER:** Displays the tracker letter for a contact selected on the display if it has a tracker assigned or for the contact selected when CYCLE CONTACTS is clicked.

**CURSOR BEARING:** Displays the bearing at the cursor location or the bearing of a tracked contact when CYCLE CONTACTS is clicked.

**SIGNAL TO NOISE RATIO:** Displays the SNR at the location of the cursor.

**CYCLE CONTACTS:** Click this button repeatedly to cycle through all assigned trackers in the selected array. Information on the selected tracker displays at the left of the screen in the Tracker, Cursor Bearing and Signal to Noise fields as well as in the Track ID field below the SSAZ display.

**ARRAY:** Displays the name of the array selected in the SSAZ display.

**TRACK ID:** Displays the Track ID of the contact at the location of the cursor if it has been assigned an ID or the ID of the tracker selected when Cycle Contacts is clicked.

**ASSIGN TRACK:** When the cursor is on a contact in the selected array, click this button to assign a tracker to the contact and send all sonar information to TMA.

**Sonar Navigation Slider:** Click the appropriate icon to move the slider and switch your view to that Sonar Station.

## **AKULA NARROWBAND SONAR**

Each ship class has a unique sound frequency signature. The Narrowband function is used to classify sonar contacts by comparing the frequency signature of the selected contact against a database of known frequency signatures. The ship's computer narrows your search by presenting only those signatures that have similarities to the signature of the selected contact.

### ***Akula Narrowband Display***

The Akula's Narrowband Display is a Frequency vs. Azimuth (FRAZ) display. Lines seen on the FRAZ display represent signals received at given frequencies and bearings. Signals centered on a specific bearing are contacts. These can be selected with the Selection Overlay. The distance from the center of the display represents the frequency of the signal. The length of each line represents the bearings at which the same frequency signal is received. This length corresponds to the width of the base of a peak on the broadband display.

### ***Selection Overlay***

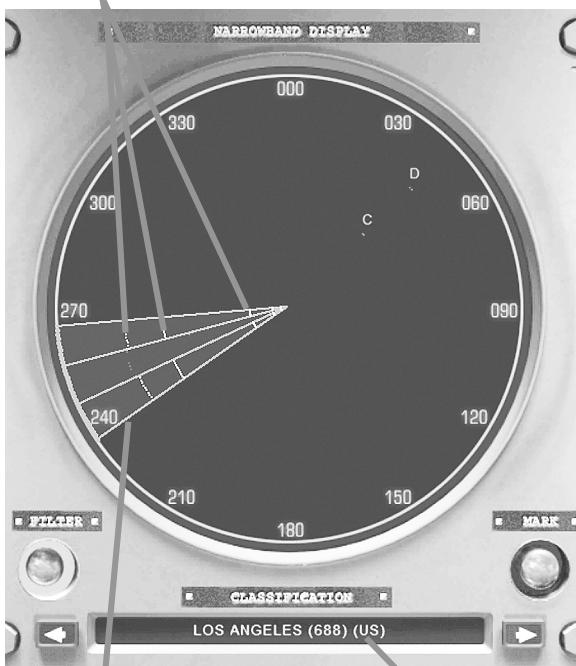
The Selection Overlay wedge acts as a cursor for selecting and designating contacts and for displaying the sound signature profiles of ships or weapons with similar signatures. An imaginary line through the exact center of the wedge is the precise bearing indicator and its position on the circular display is seen in the OVERLAY BEARING window.

The Selection Overlay is divided into three parts or wedges. The center wedge is used to select contacts.

- ⇒ Click on a signal dot or line to select it. Clicking on a contact or any part of the FRAZ display centers the Selection Overlay on that contact or position.

When a contact is selected, the outer wedges display the sound signature for whatever ship class or weapon is selected in the Classification window. When no contact is selected nothing appears in the outer wedges.

Sound Signature for class in CLASSIFICATION window



Selection Overlay    Class of the Sonar Signature seen in Overlay

### **Designating Contacts in Narrowband Sonar**

1. Select a contact by dragging the wedge shaped selection overlay and positioning the center section over the contact. To move the overlay, click the edge of the overlay and drag it to the desired location or simply click on display surface.
2. Place your cursor on one of the selected contact's frequency lines inside the wedge and click to select it.
3. Click Mark. You may have to click several times if the signal is weak. A tracker letter appears near the frequency line and the contact's alphanumeric track ID appears in the Track ID window when the frequency line is selected. The contact information is sent to the TMA screen, Nav map and the Fire Control Station.

### **Classifying Contacts in Narrowband**

When a contact is selected, its sound signature displays in the center wedge of the Selection Overlay and the sound signature profile of the ship class named in the Classification window appears in the outer wedges of the selection overlay.

1. Compare the frequency lines of the selected contact in the center to that of the profile in the outer wedges.
2. Adjust the Frequency Scale Dial to see distinct ranges more clearly.
3. Click the left and right facing arrows next to the CLASSIFICATION window to select other ship profiles for comparison.
4. Click FILTER to narrow the search to the most likely profiles. (A red ring around the filter button indicates it is on.) . When the filter is on, only ships or weapons that have a profile similar to that of the selected contact are available. All platforms and weapons in the game are available for review if the filter is off.
5. Click MARK. Note the Track ID of the selected contact in the TRACK ID window.
6. On the Nav Map, select the symbol of the Track ID that you just identified in Narrowband. In the DDI the class name visible in the Narrowband CLASSIFICATION window is now assigned to the contact and the NTDS symbol on the map is appropriate for that category of platform. You must still assign an ID (Friendly, Hostile, etc.)

## **Akula Narrowband Station Components**

The buttons and areas of the Akula Narrowband Station are described briefly below.

**NARROWBAND DISPLAY:** Displays frequency signals at specific bearings and the Selection overlay used to select and mark them.

**CLASSIFICATION:** The names of ship classes with sound frequency profiles similar to that of the selected contact are presented one at a time in this window. When a class name is selected here, its sound profile is displayed on the outer wedges of the selection overlay when a contact is selected on the circular display. See *Selection Overlay* above.

⇒ Click the left and right facing arrows on either side of the Classification window to cycle through the list of available profiles.

**ARRAY SELECT:** Selects the array signals to be displayed in the FRAZ display. The cylindrical button is on by default and located on the bow of the sub outline. The conformal button is in the middle of the outline and the Towed Array button at the rear of the submarine outline.

⇒ Click the desired rectangle to select that array. A raised ridge appears around the rectangle of the selected array.

**FREQ. SCALE:** Frequency scale on the FRAZ display runs from the center to the outer edge where the center is zero and the outer edge is whatever scale is selected on the Frequency Scale selector dial.

⇒ Click the desired number to switch to that frequency range in the circular display. The dial moves to indicate the frequency selected.

**CURSOR FREQ:** Displays the frequency at the location of the cursor.

- ⇒ Click the FRAZ display to see the frequency at that location in the display in the Cursor Frequency window.

**OVERLAY BEARING:** Displays the bearing at the end of an imaginary line drawn through the exact center of the Selection Overlay.

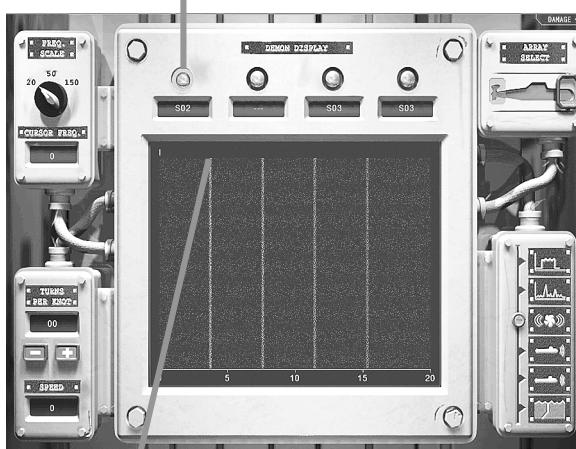
**TRACK ID:** Selecting a frequency line that has been assigned a tracker displays the alphanumeric designation for that contact in this window.

## AKULA DEMON SONAR STATION

DEMON is an acronym for Demodulated Noise. The DEMON function is used primarily to determine a contact's speed. This is important information when establishing an accurate firing solution and once determined at the DEMON Station the value can be entered in the speed field in the TMA trial solution field.

The main component of the DEMON Station is the DEMON Waterfall Display. The waterfall display separates the selected signal into demodulated components. On the display, the horizontal axis represents frequency and the vertical axis represents time. When a contact is selected its signal appears as parallel vertical lines in the waterfall. The lines represent sound generated by the contact's propellers.

Selected Tracker



Select the first line

### Using DEMON to Calculate Speed

1. First determine the class of the contact in Narrowband, ESM or the Stadiometer. In the USNI Browser, find the entry for the ship or sub's class and make note of the turns per knot number listed in the TPK field.
2. Ensure that there is a tracker assigned to the desired contact in Broadband sonar.

3. In ARRAY SELECT click the desired sensor button in the submarine outline. The button on the bow of the outline selects the Cylindrical Array. The aft button selects the Towed Array. A raised ridge rims the selected button.
4. Under DEMON DISPLAY click the round silver button associated with the desired contact ID. A red ring around the button indicates that button is selected.

✓ **Note:** If the game is paused, no lines appear in the waterfall display.

5. If necessary, adjust the frequency to better view the signal. If the lines in the display seem to blur together, switch to a lower frequency range. If the lines run off the right edge of the display, increase the frequency range. To adjust the frequency range, click the desired number on the FREQ. SCALE Dial.
6. Determine the Turns Per Knot (TPK) for the known target. The TPK information for all ships in the game can be found in the U.S. Naval Institute Reference entry for the platform class.
7. Place the waterfall cursor over the line farthest left.
8. Click the + or - buttons in the Turns Per Knot panel to set the desired value for the known contact. The speed of the target appears in the Speed field below the buttons.
9. When you have determined the speed of the contact, enter that speed in the TMA field for the selected contact.

### **Using DEMON to Determine Category**

By determining the number of blades on a contact's propeller, listening to the sounds it emits and observing the contact's behavior you can make an educated guess as to the category of the contact.

1. Select a sonar array as described above.
2. Select a sonar contact by clicking on a tracker button as described above. Vertical lines appear in the waterfall. The first line on the left indicates the shaft rotation speed. The other lines indicate individual blades on the propeller.
3. If necessary, adjust the frequency scale until the lines display clearly and individually on the waterfall.

Use the following criteria to help categorize the selected contact:

**Merchant Vessels/Tankers:** Typically three or four blades; noisy; often maintains predictable course.

**Warships:** Typically four or five-bladed propellers; quieter, smoother sound than merchant ships; possibly unpredictable course changes.

**Submarines:** Five, six or seven-bladed propellers; very quiet when submerged and at low speed; unpredictable course changes.

**Fishing Vessels/Trawlers/Pleasure Craft:** Three- or four-bladed propellers; noisy; erratic courses and speeds, frequently stopping and starting.

- ✓ **Note:** Turns per knot for military and civilian ships are found in USNI Reference. Click **CIVILIAN** in the Country column then the name of the ship type to find TPK information on Civilian ships.

## AKULA ACTIVE SONAR STATION

Active sonar should be used only when absolutely necessary since it provides the enemy with a wealth of information. *S.C.S. - Dangerous Waters* models medium and high frequency active sonar for all classes of Akulas.

### Medium Frequency (MF) Active Sonar

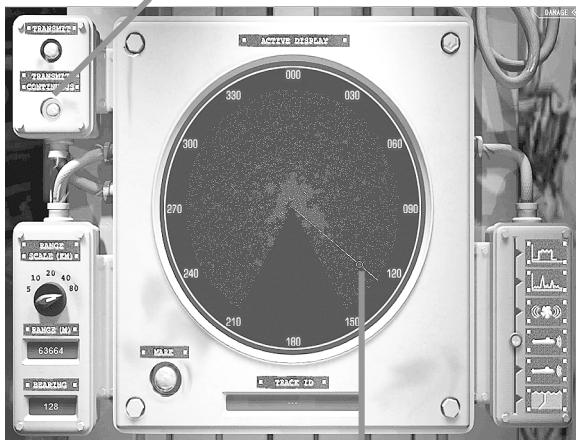
The cylindrical array in active mode is used to detect and track contacts. Echoes from a single ping or a series of pings are used to determine an object's bearing and range. Information from a medium frequency active search is sent to the TMA station for use in plotting a firing solution for the given contact. While this information is very useful to you, it comes at a price. Using active sonar gives away your bearing and alerts any ship in the area to your presence. The ship may well assume you have hostile intentions since active sonar is used primarily for targeting.

### MF Active Sonar Display

In the Akula's circular display the area closest to the center represents objects closest to your ship. The circle represents bearing. The screen updates from the center out. Each subsequent ping replaces the oldest data with the newest.

The display shows the results of active sonar echo ranging. Speckled areas represent echoes from the ocean background, reverberation, in general. The area of blank space represents the area behind your ship, active sonar baffles. Since the signals transmitted from your bow array cannot reach the area behind your ship, no echoes are returned from that area.

Click to transmit. Click again to stop continuous transmission.



Bearing-Range Cursor

**Active Sonar Contacts:** Contacts appear as brighter spots on the active display. A metallic ping is heard as each contact displays. The active display shows a four-ping history, which is useful in detecting contacts with weak signal strength.

**The Bearing-Range Cursor:** The cursor in the active display consists of a circle attached to a vertical line that indicates a specific bearing. The position of the vertical line on the Bearing Indicator represents the bearing of the cursor. The distance of the circular cursor from the center of the display represents its range from Ownship.

### To Mark a Contact with Active Sonar

1. Click the number of the desired range on the Range Scale (KM) selector. Longer ranges are appropriate for the initial search. Once a contact is detected, you can adjust the range scale of subsequent transmissions to improve the accuracy.
  - ❑ Selecting a new range halts continuous transmissions. You must click transmit again to resume transmissions.
2. Select transmission mode: Single or Continuous pings. If Single is selected, only one active sonar ping is transmitted. When Continuous is chosen, active sonar pings are transmitted at a set interval until the switch is reset to Single or you change the range scale.
3. Click TRANSMIT or TRANSMIT CONTINUOUS to send transmission s of that type.

✓ Note: To stop the transmission of continuous pings on any of the submarines, click again on the TRANSMIT button.

- A valid contact gives consistent visual returns that are brighter than background noise or reverberations. The audio return will have a distinctive metallic ring to it and will be distinguishable from the background noise.

4. Click on a contact to select it with the Bearing-Range cursor or click and drag the cursor to center it on the contact. The contact's range and bearing display on the left side of the screen in the Range (M) and Bearing windows. Range is in meters.
5. Click MARK to assign an alphanumeric Contact ID to the selected contact. Once a selected contact has been marked, selecting it and clicking MARK again sends an update of the contact's range and bearing to TMA and the Nav Map. Contacts marked with Active Sonar appear on the Nav Map on the detected bearing and at the detected range at the end of a green line of bearing (LOB)

✓ **Note:** The cylindrical array has only four trackers. If you have all four trackers assigned in Broadband or Narrowband and designate a target in Active Sonar, the oldest tracker is removed from a Broadband or Narrowband contact for use in Active.

## **Akula High Frequency Active Sonar (HFAS)**

High Frequency active sonar (HFAS) has a shorter range and can detect smaller objects than medium frequency active sonar. When you must navigate a minefield, HFAS can be used to locate and mark mines near your ship. Once a mine is located, maneuver quickly to avoid it by the largest possible margin. Driving slowly will give you the best reaction time. Marking the mines helps you keep track of the location of the mines should you need to traverse the field again when you leave the area. One method to find a safe route is to follow another ship's path. HFAS is also useful for avoiding dangerous ice ridges during under ice operations.

### **High Frequency Active Sonar Display**

The Akula's High Frequency Active Sonar (HFAS) Display can only be reached from the Periscope Station. The HFAS screen has two modes: forward looking for traversing minefields and upward looking for under ice missions. The Akula's HFAS has a range of 3500 yards.

### **To View and Mark Contacts with High Frequency Sonar:**

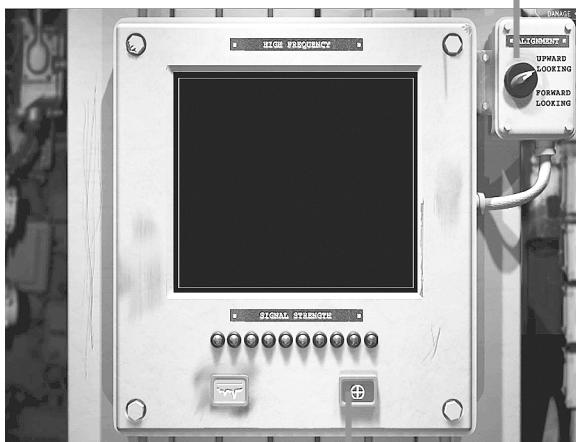
1. Press [F8] or select the periscope icon button in the Stations Menu to move to the Periscope Station.
2. Click the HFAS/Ice Display button to move to the HIGH FREQUENCY Display.



HFAS / Ice Display Button

3. Click FORWARD LOOKING in the Alignment Panel. HFAS returns from in front of the ship appear in the display screen. Click UPWARD LOOKING to use sonar returns to judge ice thickness above your ship. See *Akula Stations/Akula Periscope-Stadimeter Stations/Akula Under Ice Display*.

Select Forward Looking for Mine Avoidance.



Back to Periscope Station

4. Click the HFAS Display to place a marker on the Nav Map for all contacts detected by the sensor. No contact IDs are assigned to HFAS contacts and no information is sent to TMA. The marks appear on the Nav Map are useful for navigating a minefield.

✓ **Note:** For information on using the HFAS Display for Under Ice Operations see *Akula Stations/Periscope-Stadimeter Stations/Akula Ice Display*.

## AKULA ACTIVE INTERCEPT SONAR STATION

The circular Active Intercept Display alerts you to when another ship, sub, dipping sonar or sonobuoy is transmitting an active sonar ping. It provides the bearing of the transmitting entity as well as the frequency of the detected emission, the age of the last signal and the strength of the signal. Knowing the signal strength can assist you in determining the relative proximity of the active sonar source.

When Active Intercept detects an active sonar ping, a line is seen on the active intercept display on the bearing of the contact. The strength of the signal is represented as a bank of colored lights directly below the display that glow from green to red as the signal grows in strength.

In addition to the circular Active Intercept Display the Active Intercept Station contains the following fields and buttons.

**FREQUENCY (HZ):** Displays the frequency of the intercepted signal. (Active Sonar Frequencies for platforms and torpedoes as modeled in S.C.S. – *Dangerous Waters* can be found in the USNI Browser in the SENSORS entry.)

**BEARING (DEG):** Displays the bearing of the intercepted signal.

**INTERVAL (SEC):** Displays the interval between the last two signals.

**AGE (SEC):** Displays the time in seconds since the last signal.

**MARK:** Assigned a Contact ID on the selected signal and sends the bearing information to TMA. Each time MARK is clicked when the signal is selected, the current bearing of that contact is sent to TMA, and the Nav and Fire Control maps.

- ⇒ Click the signal lines in the Active Intercept Display to select it, then click MARK.

**SIGNAL STRENGTH:** Indicates the strength of the selected signal. Green indicates a weaker signal, red a stronger one.

**Active Intercept Display:** A line from the center of the circular display to its outer edge indicates the bearing of an intercepted signal. Thick lines indicate strong contacts.

## AKULA SSP SONAR STATION

The Sound Speed Profile (SSP) Station displays the speed at which sound is transmitted at various water depths in the area around Ownship. Ocean water typically forms distinct layers of density that can profoundly affect sonar transmissions. Warmer, less dense water forms the upper surface duct—below this, temperatures fall off sharply and density increases. The effect of this process is sound generated in one layer doesn't tend to transmit easily to the other layer, and vice versa. At the beginning of any mission, always check the depth at which the surface duct separates from the lower thermal. (See *Training/Sonar School/Underwater Sound Propagation* for more information on thermal layers.)

The Sound Speed Profile is created from information returned from an Expendable Bathythermograph (XBT) probe. When launched, the probe reports depth and sound speed information in both graph and table form.

### Launching an XBT probe

The results of the last XBT probe are visible in the display window and on the tablet when the SSP station is first entered.

- ⇒ Click the XBT button. The previous results are cleared from the display and the tablet when a new XBT is launched.
- Updated information does not appear instantly on the screen. The XBT probe rises to the surface and then descends before it begins reporting. This may result in a delay before the SSP updates. The layer depth is noted at the bottom of the tablet.
  - ⇒ To change the depth scale in use on the graph, click the desired number in the Depth Scale Panel.

✓ **Note:** Due to varying water temperatures at locations around the world, a distinct thermal layer is not always present. The mission designer designates the type of layer for the mission.

## AKULA UUV SONAR

In S.C.S. - *Dangerous Waters* all submarines are given Unmanned Underwater Vehicles (UUVs). These UUVs act as remote sonar sensors. Merging TMA bearing information provided by a remote sensor with data from your ship's sensors can provide a fairly accurate assessment of the range to the contact. UUVs are particularly useful when navigating minefield and can be operated in passive or active mode.

The UUV itself appears as a contact in the Broadband and Narrowband Displays but UUV sonar returns are not viewed in the Sonar Suite. UUV sonar contacts display on the Nav and Fire Control maps and in the TMA station.

UUVs are launched from the Fire Control Station and are wire-guided like torpedoes from there. See *Akula Stations/Akula Fire Control Suite/Deploying and Wire-Guiding UUVs* for complete information.

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## AKULA RADAR STATION [F3]

Submarine radar should be used with caution and only when the situation mandates its use. When you use radar you communicate your presence, your bearing, your proximity and who you are if the other platform is equipped with EW or ESM equipment.

### MARKING CONTACTS WITH RADAR

1. Ensure that Ownship is at Radar Depth (19 meters) or less and moving at 8 knots or less if the sail is submerged. (This is shallower than periscope depth.)
2. Click RAISE in the lower right of the station to raise the mast. The READY light glows when the radar mast is extended and radiating.
3. Set Range Scale as desired and turn on Range Rings in the upper right of the station if desired.
4. Contacts show up as brighter spots on the display. Click a contact to select it with the Bearing-Range Cursor.

5. Click MARK to send the contact's bearing and range to TMA and the Nav Map.

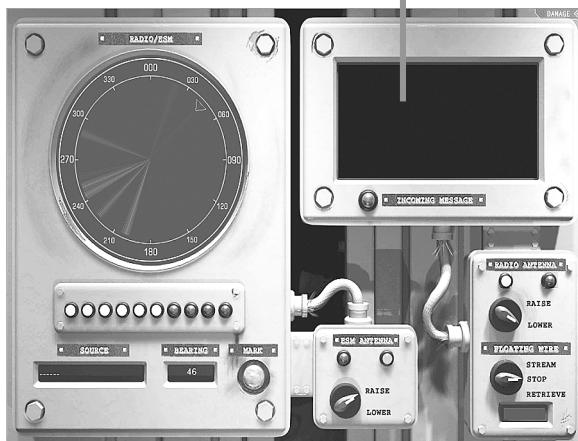
✓ **Note:** Radiating while the mast is submerged destroys the radar. Be sure you are at 19 meters or less before raising the Radar mast.

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## AKULA RADIO-ESM STATION [F4]

In S.C.S. - *Dangerous Waters* the ESM (Electronic Support Measures) station and the Radio Room are combined. ESM allows you to detect and classify contacts when submerged with your ESM mast extended above the surface of the water. The radio is used to receive intelligence, tasking and Link position updates while underway and send position and contact updates to members of your Link.

Radio Message Window



## ELECTRONIC SUPPORT MEASURES (ESM)

The ESM mast is designed for the passive detection of radar emissions. This sensor detects any platform in your area that is employing radar. Because you must have your ESM mast exposed, you make your ship vulnerable to detection when using ESM.

The ESM sensor provides a bearing to detected contacts. The ship's computer analyzes the detected transmission and compares it to those in its database thus providing the class of the transmitting platform.

### Detecting/Classifying Contacts with ESM

1. Come to a depth of 19 meters or less and maintain a speed of 10 knots or less if the sail is submerged before raising the ESM mast.

2. Click the ESM ANTENNA switch to the RAISE position to raise the mast. When the triangular cursor appears in the ESM Display, the ESM is in detection mode. Contacts appear as lines emanating from the center of the display on a specific bearing.
3. Click a contact signal in the ESM Display to determine contact bearing and to view the source of the signal (The name of the detected emitter appears in the SOURCE field.) The bearing to the contact appears in the Bearing readout.
4. Take note of the intensity of the contact on the ESM Display and the number of ESM Signal Strength Indicator lights that are lit. A strong signal can indicate that the contact is relatively close. (Green indicates a weaker signal, red a stronger one.)
5. Click a contact signal to select it then click MARK. This assigns an alphanumeric contact ID to the contact and sends it to TMA and the Nav Map. ESM contacts have **E** designations (E01, E02, etc.). Once marked the Contact ID appears in front of the Emitter name in the SOURCE field.

When MARK is clicked, the contact selected in the ESM display is automatically assigned a classification determined by the ships computer. This classification is based on platforms known to carry the detected emitter shown in the SOURCE field. When the contact is selected on the Nav Map the DDI will list that class name in the CLASS field. You must still assign an ID (Hostile, Friendly, etc.) from the Contact Menu on the Nav Map.

## RADIO ROOM

The right side of the ESM-Radio console represents the Radio Room. Here messages containing important intelligence and tasking information are received and contact positions are downloaded from any platforms in the area that are part of your Link network. (A Link network is modeled for all controllable platforms in S.C.S. – *Dangerous Waters*. Any platforms on your current Ownside are part of your Link.)

When your submarine starts a mission submerged, you see no Link data on the Nav Map even though Show Link Data is on by default. To determine if there are Ownside platforms in your area follow the steps below. When Link information is downloaded, any surface or air Link participants and any contacts they have detected appear on the Nav Map. You may never see the symbol for any submerged Link participant that is in the mission since he must be at comms depth with his mast extended for you to see him.

### Receiving Radio Messages and Link Data

To receive messages you must come to communications depth (comms depth) and raise the radio mast or stream the floating wire antenna. There are advantages and disadvantages to both modes. The radio mast receives messages more quickly but exposing the mast leaves you vulnerable to

detection. The floating wire receives messages far more slowly but you do not need to expose a mast to receive messages.

1. Select either the floating wire antenna or the radio antenna mast to receive the message.

**Radio Mast:** Take the ship to **20 meters** or shallower and set ship speed to 10 knots or less when the sail is submerged to avoid damaging the mast when it is raised. When the depth and speed prerequisites are met, click RAISE under Radio Antenna to extend the radio mast.

**Streaming Wire:** You do not have to come to periscope depth but it helps to be fairly near the surface. Set ship's speed to 18 knots or less to avoid damaging the wire. Slower speeds allow the wire to float up more quickly. If speed exceeds 5 knots, the wire may never reach the surface of the water. Make sure the wire is streamed to at least half of its length in order to ensure message reception. In the Streaming Wire panel click STREAM. The readout below the switch indicates the length of the wire that is currently deployed. Click STOP when the desired length has been deployed.

2. Look at the message screen for incoming messages. A scroll bar appears in the message window if there are more messages than can be displayed at one time. The newest message traffic is always at the bottom of the scrolling text. Message traffic may not appear immediately. When a message is received, the INCOMING MESSAGE light glows briefly.
3. Look at the Nav Map if you are waiting for Link data to determine when the information has been downloaded.
  - ❑ Single player mode: If another Ownside platform in the mission is a submarine, you must both be at comms depth with a mast or the antenna deployed before you see him as part of your Link Data. Since it is unlikely that these conditions will be met, you may never see an Ownside sub in your Link download.
  - ❑ Multiplayer mode: If another Ownside sub is player driven, you *both* must be at comms depth *with the radio mast extended at the same time* before you will see each other. If you have your radio mast extended and he has his floating wire out, he will see you but you will not see him. The radio mast is needed to transmit position data.
4. After the desired information has been received, click LOWER to lower the Radio Mast or RETRIEVE to retrieve the streaming wire.

✓ **Note:** Radio message text also appears in the Radio History Window on the Task Bar. When a new message is received, the radio history selection button (the green square) on the Task Bar flashes until the button is selected. You can raise and lower the radio mast from the

Task Bar's Orders Menu from any screen provided you are at a safe depth and speed.

## Promoting Contacts to the Link

In some cases the Link participants in your area could be unaware of a contact that you have detected if the contact is out of range of their combined sensors. In this case you may want to promote your contact to the Link to share it with other link participants in your area. (Your contacts are not automatically shared with the Link participants as theirs are shared with you in single player games.)

During Multiplayer games contacts detected by Ownside platforms controlled by other players do not share data across the link automatically as the AI Ownside platforms do. Part of your task in Multiplayer games is to promote your contacts to the Link so that other Ownside Link players can see your contacts. Other players must promote their contacts before you are able to see them on the Nav Map. You are only able to see them when Show Link Data is on.

Just as you must raise your radio antenna or float the wire to download Link updates, you must also come to Communications Depth (Comms depth) and raise the Radio antenna before you can to promote your contacts to the Link.

1. Come to Comms Depth (**20 meters**) and raise the radio antenna. Do not exceed 10 knots while the sail is submerged or the mast will break.
2. From the Nav Map, select the contact you want to promote. From its Contact Menu (right-click menu) classify the contact as surface or subsurface if known and apply any alliance or class information that you have to the contact.
3. If possible determine an accurate firing solution and enter it at the TMA station.
4. From the Contact Menu select Promote to Link. In the DDI a new field appears labeled "**Promoted**". This field displays the time in the mission at which you promoted the contact to the Link.

The contact's symbol appears on the Nav Map of any players in a multiplayer game that are part of Ownside and have access to the Link. A 4-digit track ID is assigned based on your Platform ID. This 4-digit number is seen in parentheses following the time of promotion in the "Promoted" field. In single player games, AI platforms attack contacts promoted as hostile. The AI investigates contacts promoted as unknown. See *Navigation Station/2D Navigation Map/Contact Menu/Promoting a Contact to Link* for full information on promoting a contact to Link.

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## AKULA NAVIGATION STATION [F5]

The Navigation Station, with its Nav Map and 3D View is the default view when entering a mission. The Navigation Station functions the same regardless of controllable platform and is covered only once in this manual. See *Navigation Station*.

The *Navigation Station* section covers how to play from the Nav, what is seen on the Nav Map and the 3D View and information on NTDS symbols and colors as well as what is seen when various filters are applied.

## AKULA OWNERSHIP AND ORDERS MENUS

To access the Ownship Menu, click the Ownship NTDS symbol on the Nav Map to select it, then right-click on the Ownship symbol. The majority of the Akula's Ownship Menu items are identical to those in the Task Bar Orders Menu. See *Akula Stations/Akula Task Bar/Orders Menu*. The rest of the Ownship Options require the use of the Nav Map. These are the same from platform to platform and are described in *Navigation Station/2D Navigation Map/Ownship Menu*.

**Fire Tube [X]:** This option appears in the Ownship Menu only when a target is assigned to a tube and the tube is readied to fire in the Fire Control Station. When all that is left to do is fire the tube, this option is available. Select it to fire the designated tube.

## AKULA CONTACT MENU

The Contact Menu appears whenever you right-click on a selected contact's NTDS symbol. Most menu items are the same from platform to platform and these are covered in *Navigation Station/2D Navigation Map/Contact Menu*.

**Engage With:** The weapons that appear in the Akula's *Engage With* option are found in *Akula Stations/Akula Fire Control Suite/Akula Tactical Weapons* and the *Akula Strategic Weapons*. Only weapons appropriate to the selected target are available. Others are greyed out.

**Spec Ops:** This option is only visible when the mission designer has included the Deep Submergence Rescue Vehicle or a Special Forces team in the mission. It displays a submenu of Special Operations. Follow tasking messages in the mission for specifics on deploying the special ops units in the game.

**Deploy DSRV:** Select this option to deploy the Deep Submergence Rescue Vehicle to the selected contact. This option is only selectable when the following conditions are met:

- The DSRV is present on the Sub's hull. (The DSRV is only available if the mission creator added it to the mission.)
- The selected contact is a submerged submarine

- ❑ Ownship depth is greater than periscope depth.
- ❑ Ownship speed is 3 knots or less.

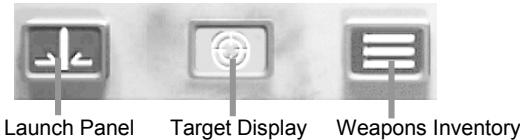
**Deploy Special Forces:** This menu is greyed out until speed and depth requirements are met. It is available only in the Contact Menu under these conditions:

- ❑ The selected contact is a surface ship or landbased target (Category: Stationary) such as a building or the floating Oil Rig)
- ❑ Ownship has Special Forces aboard.
- ❑ Ownship is traveling at periscope depth or less and at 3 knots or less.

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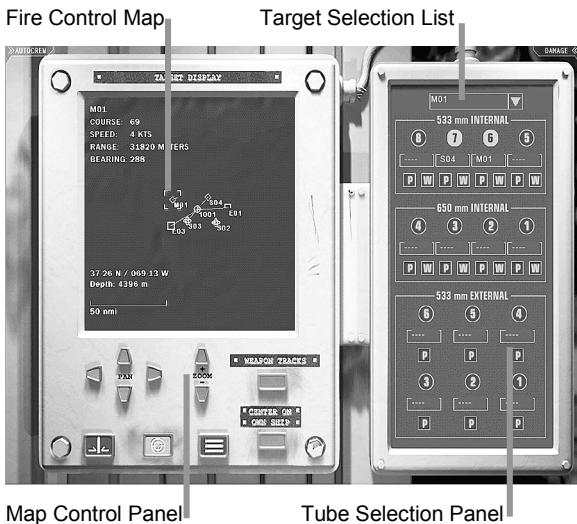
## AKULA FIRE CONTROL SUITE [F6]

The Akula's Fire Control Suite consists of three stations: the Target Display, the Launch Panel and the Weapons Inventory. These stations are reached by clicking one of the navigation buttons at the bottom right of the Akula's Fire Control Stations. Target Display is seen as default at game start.



### AKULA FIRE CONTROL TARGET DISPLAY

The Akula Target Display consists of the Fire Control Map, the Target Selection List, the Tube Selection Panel and the Map Control Panel. These areas are described here.. See *Akula Stations/Akula Fire Control Launch Panel /Basic Launch Procedures* for information on how to use the displays and panels to launch weapons, mines and countermeasures.



## Fire Control Map

All sensor contact symbols seen on the Nav Map are also seen on the Fire Control map. If you have Show Link Data on, Link participant symbols and Link contacts symbols also appear. The TMA or Link solution data for a selected contact appears in the upper left corner of the map in the Fire Control DDI area. This solution data is constantly updated assuming the course and speed designated when the solution was entered in TMA or provided by the Link. This information is used by the Fire Control System to predict the location of the target so the weapon can steer an intercept course until it is close enough to detect the target and begin homing.

You are allowed to target Link contacts as well as Link participants from the Fire Control Station, however the latter is not recommended. Link contacts are only available if you have first downloaded Link data. Link contact positions are not updated once you lose radio contact.

- ✓ **Note:** If Show Truth is ON, no Contact IDs appear in the Target Selection List. Only Snapshots (bearing only) can be assigned to a weapon.

## **Fire Control Map Controls**

Below the Fire Control Map are several buttons used to help narrow the view or display only the data that you wish to see.

**PAN:** When the map is zoomed in, click the PAN buttons (or click and drag on the map or use the keyboard arrow keys) to adjust the map view.

**ZOOM:** Click + in the ZOOM controls (or press [CTRL] and click the map) to zoom in on the clicked location. Click – in the ZOOM controls (or press [CTRL] and right-click) to zoom out.

**WEAPON TRACKS:** When this button is ON (lit) all waypoints assigned to any land attack missile or mobile mine display on the map. When this option is OFF only the waypoints for the weapon assigned to the selected contact show on the map. Click to toggle the state of this button.

**CENTER ON OWNSHIP:** When this button is ON (lit) the Ownship symbol is centered in the Fire Control map when the map is zoomed.

**Keyboard Controls:** When the cursor is in the map, press [SHIFT] + X to toggle the display of the Longitude and Latitude and depth display. Select [SHIFT] + Z to toggle the display of the range scale.

## Fire Control Target Selection List

At the top of the Tube Selection Panel area is the Target Selection dropdown list. This drop-down list contains all of the contacts currently marked by Ownship or by the Link if Show Link is ON. A Contact ID selected in this list is available for assignment to a specific tube as described below with the following caveats.

**Contact with a LOB:** Contact IDs for contacts with a line of bearing (no TMA solution) cannot be assigned to a tube. They can be targeted with a snapshot.

⇒ Create a TMA solution for the contact to make it available for tube assignment.

**Unknown Category Contacts:** Contact IDs for contacts that have a TMA solution but have not yet been classified as either a surface or sub surface platform type cannot be assigned to a tube. See Note In *Tube Selection Panel* below. A snapshot can be assigned.

⇒ Select the contact in the Nav Map and from its right-click menu designate it as surface or subsurface to make it assignable.

## Tube Selection Panel

From the Tube Selection Panel contacts are assigned to specific tubes and weapon presets are entered. The torpedo wire guide controls for the Internal Tubes are also accessed from this panel.

A number represents each of the Akulas eight internal torpedo tubes and six external torpedo tubes.

✓ **Note:** The Akula has a double-hull construction. The tubes designated as external tubes are external to the pressure hull and cannot be reloaded when the sub is underway. The internal tubes are accessed from within the pressure hull and can be reloaded.

The eight internal tubes consist of four 65 cm tubes numbered 1- 4 and four 53 cm tubes numbered 5 – 8 and occupy the upper portion of the Tube

Selection Panel. The six external tube selectors are numbered 1 through 6 and are located in the lower portion of the panel.

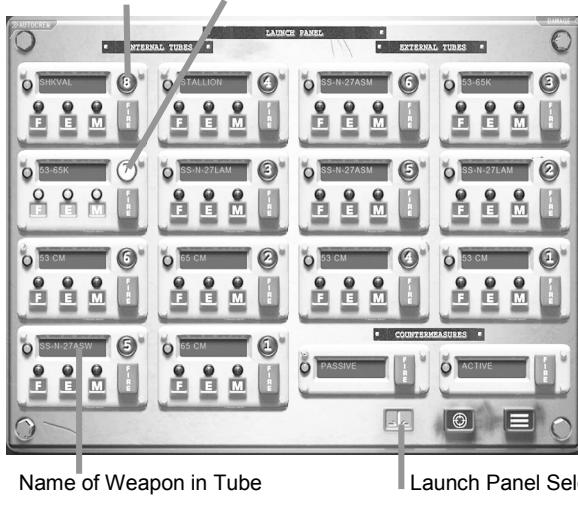
- ⇒ Select a contact ID from the Target Selection List.
- ⇒ Click the number of the desired tube to assign the weapon in that tube to the selected target. If the weapon in the selected tube is not appropriate for the contact, it cannot be assigned to the tube.

✓ **Note:** Certain weapons can only be used against submarines. You are not able to assign a sub-only weapon to a target designated as a surface contact. Until a contact is classified as surface or subsurface, it cannot be assigned to any tube. You can shoot a snapshot down the bearing to the contact.

## AKULA FIRE CONTROL LAUNCH PANEL

From the Launch Panel weapons selected in the Target Display are launched. Prior to launching a weapon the tube must be flooded, the pressure equalized and the muzzle door opened. Once these steps have been completed, the weapon can be fired. Once the launch procedure is initiated for a tube, the name of the weapon in the window is greyed out and the weapon cannot be changed until the launch procedure is halted and the steps reversed.

Tube Number Number lights up to indicate interlock



### Basic Launch Procedure

1. Assign a target to a tube in the Target Display and assign preset values as described above, then find the corresponding tube number in the Launch Panel.
2. Click **F** to flood the tube.

3. Click **E** to equalize the water pressure in the tube.
4. Click **M** to open the muzzle door. The tube number and the interlock lights illuminate indicating the weapon is ready to fire.
5. Click **FIRE** to lift the cover; click again to fire the weapon. When the tube is empty, the red interlock light to the left of the weapon name window goes dark and the word **EMPTY** appears in the window.

✓ **Note:** If you have not yet assigned a target to the tube, the **FIRE** button is disabled and the tube number does not illuminate. Once a target is assigned in the Target Display panel, the tube number illuminates and the **FIRE** button is enabled.

6. To wire-guide a torpedo with that capability return to the Target Display screen and click the **W** under the tube number. **W** stands for wire guidance. See *Akula Stations/Akula Fire Control Suite/Targeting Sea Contacts/Torpedo Wire Guide Controls*.

**Tip:** If a tube number does not light up and the Fire button does not respond, check to make sure there is a target assigned to the tube. Also check the High-Pressure Air bank in Ship Control. A weapon launch requires a charge of at least 50% in your air banks. See *Akula Stations/Akula Ship Control Station* for information on charging the air banks.

### To Reverse the Launch Process Prior to Firing:

Until the weapon is actually fired, the launch process can be reversed. In this situation the steps must be manually reversed, one step at a time. The muzzle doors must be closed and the tube re-pressurized and drained allowing a different weapon to be loaded.

⇒ Click the buttons in the reverse order (**M** then **E** then **F**) to prepare the tube for reload. The button flashes and goes dark indicating the next button can be clicked. Reload the tube as described below. (This process happens automatically when **M** is clicked after a weapon has been fired.)

### Countermeasure Launch Procedure

1. Determine the type of countermeasure needed. Change loadout if needed.
2. To select a different countermeasure or load an empty tube, click the name of the countermeasure. Continued clicks cycle through the available options. The name flashes while loading and the tube cannot be fired until flashing stops.
3. Click **FIRE** to open the cover, and click again to fire the countermeasure.

### Tube Reload Procedure

Only internal torpedo tubes can be reloaded when underway.

- ⇒ If the weapon name display reads EMPTY, click to load a weapon. Repeated clicks cycle through available weapons.
- If you click an empty tube and the weapon names do not cycle, the muzzle door for that tube is still open. Click **M** to close the muzzle door and wait until the tube is no longer flooded, and then reload the tube. Remember that closing the muzzle door cuts the wire on torpedoes and UUVs and they can no longer be wire-guided.
- ⇒ To change the weapon loaded in a tube click the weapon name until the desired weapon name appears.

✓ **Note:** The unload/load process takes approximately seventeen minutes. Loading an empty tube takes 8.5 minutes. If the **Fire Control Quick Launch** option is selected in the *Options>Game* page the time it takes to unload then load a tube is cut to 40 seconds and loading an empty tube takes 20 seconds.

- The red interlock light to the left of the weapon name flashes until the weapon reload is complete.

## TARGETING SEA CONTACTS

1. To assign a contact to a tube, select the desired Contact ID from the Target Selection List in the Target Display or click a contact symbol on the Fire Control map to automatically select it in the list.
  - To send a weapon down a specific line of bearing, select Snapshot from the Target Selection List.
2. Click the number of a tube containing a weapon appropriate for the target. The contact ID appears below the tube number indicating this contact is now assigned to this tube.
  - See *Akula Stations/Akula Fire Control Suite/Akula Fire control Target Display/ Fire Control Target Selection List* for instances that prevent a contact from being assigned to a tube.
3. Click **P** below a tube number to display the presets for the weapon. For information on all presets see *Akula Stations/Akula Fire Control Suite/Akula Weapon Presets*.
  - If your Fire Control Autocrew is on, he enters the presets for you.
  - For a Snapshot, enter the desired LOB along with other desired presets.
4. When presets are entered click the Launch Panel icon and initiate the launch procedure for the desired tube. (See *Akula Stations/Akula Fire Control Launch Panel/Basic Launch Procedure*.)
5. Once a wire-guided torpedo is launched, return to the Target Display and click the **W** button associated with the proper tube to display its Wire Guide Controls for a wire-guided torpedo.

## Torpedo Wire Guide Controls

Any Akula interior tube can fire wire-guided torpedoes. Once a torpedo is fired, its symbol appears on the Fire Control map. When a wire-guidable torpedo enables, two red lines extend from the torpedo symbol indicating the weapon's search cone. Until a torpedo enables (begins its search), it can be wire-guided.

- ⇒ Click **W** below the desired tube to wire guide the torpedo from that tube. The **W** is only selectable if the tube has fired a torpedo that can be wire guided.

**Heading:** Click the right facing arrow to increment the weapon's ordered heading. Click the left facing arrow to decrease the ordered heading.

**Enable:** Click to enable the weapon before it reaches the enable distance set in the *Run To Enable* preset and start the weapon in its search mode.

**Pre-Enable:** Click to return an enabled weapon to its pre-enabled state without shutting the weapon down entirely. If you want to wire guide a weapon that has already enabled and started its search, click this option. The red enable cone disappears. Once the weapon detects a contact and begins homing, it can no longer be pre-enabled. It can only be shutdown.

**Shutdown:** Click to shut down the weapon entirely. The weapon cannot be enabled again if this option is selected.

- ✓ **Note** A torpedo is searching as long as it is snaking or circling (as set in the presets). If the weapon heads on a straight path, it is homing.

## ATTACKING LAND TARGETS

In S.C.S. – *Dangerous Waters* all Akulas can carry the SS-N-27 Land Attack Missile (LAM) missile. To attack a land target from Fire Control, the latitude and longitude coordinates of the site must be fed into the fire control system and a series of waypoints defined for the missile to follow. The coordinates are usually defined in a tasking message.

1. Set Ownship depth to 100 meters or less and a speed of 6 knots or less. Do not fire the missile until this depth and speed have been achieved or the Missile will fail.
2. Select a tube containing a land attack missile. Click **P** to open the Preset Panel for the tube.
3. Click **DEFINE TARGET WAYPOINTS** then click the Fire Control map to place four weapon waypoints. The number next to the last waypoint indicates the tube number.
  - ⇒ Click a waypoint to enter exact coordinates in the Latitude and Longitude presets or click and drag the waypoint to the desired

location. Watch the latitude and longitude readout in the lower left corner of the Fire Control map as you drag the waypoint to determine its current location.

- The outermost waypoint should be placed at the exact latitude and longitude of the target as specified in your orders.
- If a landfall waypoint is directed in your tasking make sure that one of the earlier waypoints is placed at that latitude and longitude.

4. Set the destruct range for the missile. This is the range at which the missile will self-destruct if it has not encountered a target.
5. Initiate the launch procedure for the tube in the Launch Panel.

✓ **Note:** Land sites with Contact IDs can be targeted from the Nav Map using the Contact Menu's Engage With command.

## LAYING A MINEFIELD

Occasionally you may be instructed to lay a minefield.

1. Check your tasking or determine the exact latitude and longitude for each mine to be placed.
2. Determine which tube will fire the mine destined for each specific location. From the Launch Panel, load the desired tubes with mines.
3. In the Target Display Panel select each tube individually and place a waypoint for that mine to follow. Click P then click DEFINE TARGET WAYPOINT and click the Fire Control map top place the waypoint.
4. Select the waypoint and drag it to the desired location using the lat/long readout at the bottom of the Fire Control map. You can also enter the desired latitude and longitude in the waypoint presets.
  - The waypoint presets appear below the Define Target Waypoint button in the preset panel a soon as the waypoint is placed on the map.

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**Tip:** Once mines are loaded and presets are entered, you can fire the tube from the Nav Map using the Ownship or Orders Menus. Map Markers can be placed on the Nav Map indicating the mine location and a launch point for the mine designated for that location. Using this method you can better tell when to fire the tube. See *Navigation Station/2D Navigation Map/Nav Map Menu*.

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5. After firing the mine, reload the tube with a new mine or weapon.

## DEPLOYING AND WIRE-GUIDING UUVs

Because a UUV is a sensor, not a weapon, it need not be assigned a target in the Target Display to be fired.

1. Set Ownship speed to 4 knots or less. Do not launch the UUV until that speed has been achieved.

2. To launch a UUV to a depth other than Ownship depth, first select the tube containing the UUV in the Target Display and click **P** to display its presets.
3. Click the checkmark to deselect *Use OS Depth* and display the *Depth* preset. Click a digit to increment its value. Right-click to decrease the value.
4. Select the desired tube in the Launch Panel and initiate the launch procedure as for a torpedo.
  - ❑ If a UUV is in a tube it can be launched from the Orders or Ownship Menus using the Fire Tube command without visiting the Fire Control Station. It will be launched at Ownship's depth.

### **Wire-Guiding/Enabling UUV Active Sonar**

To guide the sensor to the desired location and to enable active searching, follow these steps.

1. From the Target Display select **W** below the tube that fired the UUV to display the wire-guide controls.
2. Click the Ordered Course arrows to adjust the course of the UUV.
  - ❑ Passive sonar mode is on by default when a UUV is launched but active sonar mode can be enabled at any time as long as the wire is still attached and the 30-minute battery is functioning. Be aware that capable ships and subs in the area can detect UUV active sonar. However, active sonar may be necessary when traversing a minefield. Follow these steps to enable UUV active sonar.
3. Click **ENABLE** to initiate active sonar.
4. Click **PRE-ENABLE** to de-activate active sonar and return to passive mode.

✓ **Note:** Closing the muzzle door after launching the UUV cuts the guidance wire. Once the wire is cut the UUV no longer sends sonar returns.

### **UUV Returns**

Sonar returns from the UUV are automatically assigned a Contact ID and can be found in the TMA Selected Track drop-down list and on the Nav and Fire Control maps. UUV sonar returns do not show up on any of the screens of the Sonar Suite although the UUV itself displays as a contact in Broadband and Narrowband Sonar. Depending on its course, the UUV may provide returns on Ownship.

- ❑ A contact detected by a UUV in passive mode appears on the Nav Map as a yellow *Unknown* symbol at the end of a white line of bearing that extends from the location of the UUV at a default range of 10 nm.

- ❑ A contact detected by a UUV in active mode appears as a yellow *Unknown* symbol at the end of a green line of bearing. The length of the LOB indicates the range of the contact from the UUV.
- ✓ **Note:** UUVs cannot be retrieved. Once the battery is expended you need only close the muzzle door to cut the wire and jettison the UUV. The tube can then be re-loaded. Altering Ownship's course by more than 90° cuts the wire.

## AKULA WEAPON INVENTORY STATION

The Weapon Inventory Station simply displays the current type and number of weapons on board your sub. No interaction is possible. The total of available weapons is updated as weapons and countermeasures are dispensed.

## AKULA TACTICAL WEAPONS

The Akula can be assigned weapons capable of targeting surface ships, submarines and land targets. The Akulas also carry a shoulder SAM launcher for targeting helicopters and low flying maritime patrol aircraft. Available weapons are described briefly below.

**SS-N-16 Stallion:** This anti-submarine weapon flies as a missile on an assigned course then drops a UMG-1 Torpedo. In the game the torpedo begins homing as soon as it hits the water. The missile has a range of 100 km (54 nm). The torpedo it drops has a range of 8 km (4.3 nm) and a warhead of 100 kg. A torpedo with a maximum depth of 500 meters (1,640 ft) is modeled. It can also be used against surface targets.

- ✓ **Note:** For successful in-game launch of the SS-N-16 Stallion missile, Ownship depth must be between 50 and 350 meters and at a speed of 6 knots or less.

**53-65 K Torpedo:** This wake homing torpedo works best against surface ships, although it can also be used with limited success against submarines. It has a maximum speed of 55 knots, a range of 19 km (10 nm) and carries a 300 kg warhead. A maximum depth of 300 meters (657 feet) is modeled.

**53 cm Torpedo:** Primarily an anti-submarine torpedo, it can also be used against surface targets. This weapon has active/passive sonar and wire guidance, a maximum range of 18.5 km (10 nm), a maximum speed of 40 knots and a warhead of 205 kg. It has a max depth of 1,500 feet (~457 meters.)

**65 cm Torpedo:** This multipurpose torpedo can be used against both surface and sub-surface targets. It has an active and passive sonar guidance system and a range of 50 km (27 nm.) It has a maximum speed of 50 knots and a 900 kg warhead. It has a maximum depth of 914 meters (3,000 ft).

- ✓ **Note:** The above three torpedoes can be launched at depths up to 240 meters.

**SA-N-8 Gremlin SAM:** Fired from a shoulder-launcher from a position in the aft of the sail, these Surface to Air Missiles have a maximum range of 4.7 km (2.5 nm), can reach a maximum altitude of 3,505 meters, and carry a 2 kg (4.4 lb) warhead. (Press [F9] when the Kilo is surfaced to access the SAM launcher.)

## Gameplay Weapons

**SS-N-27 Weapons:** The three types of SS-N-27 weapons the Akula carries in the game are based on the SS-NX-27 Novator Al'fa (3M54/3M51E) class of weapons. While it is not known if the Russians have these weapons on their own submarines, they are exporting versions to other countries for submarine use.

For gameplay purposes the Akulas are given these additional weapons. The SS-N-27 weapons are replacements for the SS-N-21 Sampson missiles. The SS-N-21s have nuclear warheads and it is believed that they have been removed from the fleet. It is reported that the SS-N-27 weapons are compatible with the SS-N-21 launch system.

- ✓ **Note:** For successful in-game launch of the SS-N-27 missiles, Ownership must be at a depth of 100 meters or less and at a speed of 6 knots or less.

**SS-N-27 ASM:** This antiship weapon is based on the 3M51E missile and resembles the American TASM. It has a range of 220 km (119 nm), is low flying and has a warhead of 200 kg.

**SS-N-27 ASW:** This antisubmarine weapon is based on the SS-N-X-27 Novator Al'fa (3M54) missile designated 91RE1. In gameplay the missile drops a Type 40 torpedo that enables as soon it hits the water. The missile has a range of 35 km (19 nm); the torpedo has a maximum speed of 65 knots, a range of 13 km (7 nm) and carries a 150 kg warhead. The torpedo has a maximum depth of 600 meters.

**SS-N-27 LAM:** Based on the 3M14E land attack missile this weapon also resembles the American Tomahawk. It has a ballistic trajectory and a range of 300 km (162 nm) and carries a 400 kg warhead.

**VA-111 Shkval:** (NATO Nickname: Squall) This high-speed underwater torpedo operates on the principles of supercavitation which allow it to reach speeds of 200 knots. It has a range of 6 nm in the game and carries a 210 kg conventional warhead. For gameplay the weapon is modeled as a straight running torpedo with a magnetic influence detonator. The weapon's run to enable range (minimum range) is 2000 yards. The Shkval is not a subtle weapon. Its use alerts all in the area to your presence. When using this weapon the hope is it will reach its target before the target can respond. It is known that the Russians have this weapon, it is not known if it is actually carried by the Akulas.

## STRATEGIC WEAPONS

### Mines:

**Mobile Mine:** The Akula's mobile mine is a modified version of the 53-65K torpedo. Launched via a 53 cm torpedo tube it can travel up to 18.5 km (10 nm) after leaving the ship. The mobile mine is effective in depths from 4 – 150 meters and has a 450 kg warhead.

## AKULA COUNTERMEASURES

Countermeasures are defensive weapons used to prevent an enemy's torpedo from destroying your sub. The Akula carries Active and Passive torpedo decoys that can be launched from Fire Control Launch Panel, or via the Ownship or Orders Menus *Countermeasure* option.

**Passive Decoy:** Used against passive homing torpedoes, this decoy emits sound (noise) across a broad spectrum of frequencies in an attempt to deceive the torpedo into homing in on the decoy.

**Active Decoy:** Used against active homing torpedoes this decoy is a bubble generator that creates an area of bubbles in an attempt to provide a false echo to the torpedo.

**Decoy Depth:** Decoys fired from the Fire Control Launch Panel are launched at Ownship Depth. Countermeasures fired via the Ownship or Orders Menus *Countermeasure* option can be set to either Shallow (30 meters) or Deep (244 meters.)

## AKULA WEAPON PRESETS

Everything that can be launched from the Fire Control Station has at least one preset. Presets are instructions that tell the weapon, countermeasure or UUV what to do. All presets are presented here alphabetically by type.

⇒ Click/right-click on the digits to increase or decrease the value.

### Antiship Missile Presets

#### SS-N-27 ASM

**Destruct Range:** Sets the range at which the missile self-destructs if a target is not encountered. Use this to avoid hitting neutral and friendly ships in the area. Defaults to 50 nm (~62 km.)

**Seeker Range:** Sets the range at which the missile begins to search. This can be used to help discriminate against other shipping in congested waters. Defaults to 0 nm.

**Seeker Pattern:** Sets the area to be searched to either a wide or narrow pattern. This can be used to help discriminate against other shipping in congested waters. Click the Wide/Narrow button to toggle the selection.

- ✓ **Note:** Your ship must be at 100 meters or less and at a speed of 6 knots or less to successfully launch one of these antiship weapons.

## Land Attack Missile Presets

### SS-N-27 LAM

**Define Target Waypoints:** Click DEFINE TARGET WAYPOINTS then click the Fire Control map to place four waypoints for the weapon to follow.

**Latitude/Longitude:** Click a waypoint to display presets for setting the precise Latitude and Longitude for the waypoint. Click/right-click the preset digits to increment or decrement the number. You can also click a waypoint and drag it to the desired location. The current location of the selected waypoint appears in the Latitude/Longitude readout in the lower left of the Fire Control map.

**Destruct Range (nm):** Sets the range at which the missile self-destructs if a target is not encountered. Use this to avoid hitting neutral and friendly ships in the area. Defaults to 50 nm (~62 km.)

- ✓ **Note:** Your ship must be at 100 meters or less and at 6 knots or less to successfully launch one of these Land Attack Missiles.

## Mine Presets

### Mobile Mine

**Define Target Waypoints:** Click DEFINE TARGET WAYPOINTS then click the Fire Control map to place a single waypoint.

**Latitude/Longitude:** Click the waypoint to display presets for setting the precise latitude and longitude for the waypoint. These coordinates define the final destination of the mine. Click the digits in the preset panel to set the desired value. You can also click a waypoint and drag it to the desired location. The current location of the selected waypoint appears in the Latitude/Longitude readout in the lower left of the Fire Control map.

## Missile-Torpedo Presets

### SS-N-16 Stallion and SS-N-27 ASW

**Snapshot Bearing (deg):** The weapon is fired on the bearing entered here. (This preset only appears if Snapshot is assigned to the tube from the Target drop-down list.)

**Run To Enable:** Sets the point in yards at which the missile drops its torpedo payload. The torpedo falls to the water and enables at once.

## Rocket Torpedo Presets

### Shkval

**Snapshot Bearing (deg):** The weapon is fired on the bearing entered here. (This preset only appears if Snapshot is assigned to the tube from the Target drop-down list.)

**Depth:** Sets the depth at which the weapon travels.

**Run To Enable:** Sets the distance the weapon travels before its sensor enables. (The minimum RTE for this weapon is 2000 yards.)

## Torpedo Presets

### 53-65K, 53 cm, 65 cm Torpedoes

**Snapshot Bearing (deg):** The weapon is fired on the bearing entered here. (This preset only appears if Snapshot is assigned to the tube from the Target drop-down list.)

**Depth:** Set the depth at which the weapon travels.

**Ceiling:** Set the depth above which the weapon does not travel.

**Floor:** Set the depth below which the weapon does not travel.

**Acoustic:** Click to choose Active or Passive sonar mode. Active mode transmits active pings and follows the returns. In passive mode the weapon does a passive sonar search.

- ✓ **Note:** The 53-65K torpedo is a wake homing torpedo. It has no *Acoustic* setting.

**Run To Enable:** Set the distance the weapon travels before it enables and starts its active search. Enabling the weapon too soon can alert the target in time to take evasive measures. Enabling too late can mean the weapon runs past the target.

**Speed:** Set the speed at which the weapon travels.

## UUV Presets

**Use OS Depth:** Set the depth at which the UUV travels to that of Ownership. Use OD Depth is selected by default. Deselect the option to display the Depth option.

**Depth:** Enter the desired depth for the UUV to travel. Click a digit to increment the value. Right-click to decrease the value.

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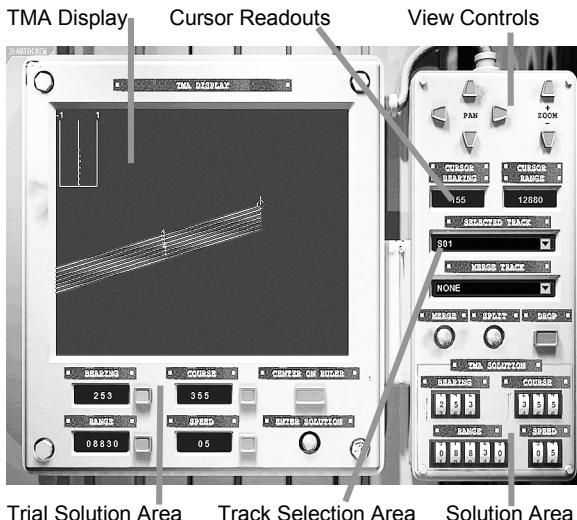
## AKULA TMA STATION [F7]

At the Target Motion Analysis (TMA) station, data from the Akula's sensors are used to determine a contact's bearing, range, course and speed. This information, called a target solution or simply a solution, is necessary to accurately target a contact with your ship's weapons.

Performing TMA is not easy and without at least a rudimentary understanding of TMA functionality it is highly unlikely that TMA can be performed successfully. Since the FFG and all submarine classes in S.C.S. - *Dangerous Waters* have a TMA station, the TMA basics are described just once in this manual. See *Training/TMA Basics* for information on how to perform target motion analysis. Refer back to that section while learning to perform target motion analysis at the Akula's TMA station.

## AKULA TMA STATION COMPONENTS

The Akula's TMA station is composed of several distinct areas: The TMA Display, the view controls and readouts, the track selection area, trial solution area and the solution area. These areas are described briefly below. See *Training/TMA Basics*.



### Akula TMA Display

The TMA Display presents a representation of Ownship, a history of bearing data for a selected contact, a TMA ruler and an error dot stack. These tools are used to analyze sensor inputs.

### Bearing lines (LOBs)

When a sensor sends a bearing report to TMA a history of each report is maintained. When a contact is selected the bearing report history for that contact appears on the TMA Display. The lines extend indefinitely for contacts reported by sensors that report only a bearing. The ruler is found at the default range of 10,000 yards.

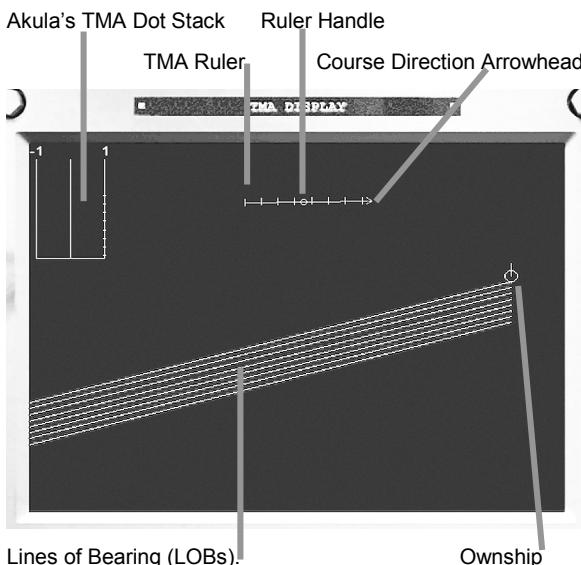
The ruler is found at the end of the LOB (the reported range) when it is reported by active sonar, radar or the stadiometer. The color of the bearing lines indicates the sensor that is detecting it.

<b>Cylindrical sonar array:</b>	White
<b>Conformal sonar array:</b>	Blue
<b>Towed array:</b>	Purple
<b>Active sonar:</b>	Green
<b>Active Intercept:</b>	Yellow
<b>Periscope or ESM:</b>	Red

<b>Radar:</b>	Yellow
<b>UVV passive sonar:</b>	White
<b>UVV active sonar:</b>	Green

## Time History Right-Click Menu

Right-click the TMA Display to change the bearing return history on the TMA Display. As long as a tracker is tracking, bearing information is sent to TMA in two-minute intervals. If the screen gets too cluttered, change the number of lines that are displayed. History options available are 10 minutes, 20 minutes (default), 1 hour and 4 hours. A check mark indicates the selected option.



## The TMA Ruler

The TMA ruler is used to generate your best estimate of the contact's course and speed. Its location on the board relative to Ownship indicates your estimate of the range of the contact. With each new bearing line an additional tick mark is added to the ruler and another dot is added to the top of the dot stack.

The ruler components are described below.

- The arrowhead on the ruler indicates the *course* of the contact.
- The length of the ruler represents the current estimate of the contact's *speed*: the longer the ruler, the faster the estimated speed.
- The distance of the ruler from the Ownship marker represents the contact's estimated *range*.

- ❑ Each tick mark represents a specific interval of time. (Towed and Bow arrays update every two minutes while radar and continuous active sonar update with every sweep or ping.) The mark at the end of the ruler represents the initial or oldest information.
- ❑ The *estimated current bearing* of the contact is a point just ahead of the arrowhead. The *last reported bearing* is represented by the tick mark closest to the arrowhead.

✓ **Note:** All of the current estimates represented by the ruler appear in numerical form in the Trial Solution Area below the TMA Display.

### Manipulating the Speed Strip Ruler

The speed strip ruler is adjusted as follows.

**Adjusting length and direction:** Click and drag the end mark or the arrowhead to adjust the length or direction of the ruler.

**Positioning Tick marks:** The tick mark closest to the arrowhead should be placed on the most recent bearing line. The end tick mark should be positioned on the initial or oldest bearing line.

**Using the Handle:** A circle appears at the center of the ruler when more than one tick is present and speed is more than zero. The circle acts as a handle. Click the handle and drag the entire ruler to another location. The handle maintains the current course and speed settings of the ruler and adjusts range and bearing.

**S.C.S. - Dangerous Waters Tip:** Center on the ruler and zoom in to better manipulate the ruler and access the handle. If you have difficulty dragging the ruler to get the arrowhead pointed in the desired direction, enter the desired course number in the course field.

### The Dot Stack

The dot stack in the upper left corner is a graphical representation of the error between tick marks and bearing lines. The dot at the top of the stack is associated with the most recent bearing line. Moving the ruler and adjusting the location of the tick marks allows you to line up the dots along the center vertical line in the dot stack. The analysis is probably most nearly correct when the top most dots are on the centerline. This process is called stacking the dots.

### Akula Track Selection Area

The area at the center right of the Akula's TMA station is used to select a contact to analyze, merge, split or drop. These fields function as described here.

**SELECTED TRACK** drop-down list: This dropdown lists the alphanumeric Contact IDs for designated contacts. Selecting a Contact ID from the list displays on the TMA Display the available history of bearing lines for that contact. The first letter of the contact designation

represents the source of the data: S for Sonar, R for Radar, V for visual (Periscope and Stadiometer), and E for ESM.

**MERGE TRACK:** This dropdown lists all contacts except the contact selected in the SELECTED TRACK drop-down list.

**MERGE:** Click to merge the contact in the SELECTED TRACK drop-down list with the contact selected in the MERGE TRACK drop-down list.

**SPLIT:** Click to split the merged (M) contact selected in the SELECTED TRACK drop-down list into its two original contact components.

**DROP:** Click to permanently drops the contact selected in the DELETED TRACK dropdown list

### **Akula Trial Solution Area**

The area below the TMA Display is used to create and fine-tune a firing solution for the selected contact. From this area the solution is entered into the ship's fire control system.

**BEARING, COURSE, RANGE, and SPEED** Fields: Represent the trial solution for the selected contact. The current position and size of the TMA ruler is reflected in these fields. These numbers are altered by dragging and resizing the ruler or by entering values directly into these fields. The ruler moves to reflect the entered values.

**Lock Buttons:** Click the red button to the right of each field to lock the value in that field. The ruler reflects the locked value. A depressed, illuminated button indicates a locked value. (If a value is locked for one contact it is locked for all. Unlock the field when analyzing other contacts.)

**ENTER SOLUTION:** Enters the values in the trial solution fields into the system. These values are now the system firing solution for this target. The NTDS symbol for this contact is located on the Nav and Fire Control maps at the designated bearing and range and moves on the course and speed entered here.

- ✓ **Note:** The ruler position for selected contact A is not retained when you select Contact B unless a solution has been entered for Contact A prior to selecting another contact. This means that unless you enter your solution, the ruler you have carefully positioned on contact A will be in a different position when Contact A is reselected. Don't lose your work. Enter your solution. You can always fine-tune it later.

### **Akula View Control Area**

The upper right area of the TMA station contains the view controls for the TMA Display. Click the PAN and ZOOM controls as needed to adjust the view. In addition to the zoom control the following keyboard and mouse commands are useful for adjusting the view:

- ⇒ Press [CTRL] + click to zoom out. Press [CTRL] + Right-click to zoom in.
- ⇒ Roll the mouse wheel forward to zoom in. Roll the wheel backward to zoom out.
- ⇒ Click the CENTER ON RULER button below the TMA Display before zooming in for the clearest view.

## **TMA Solution Area**

The TMA Solution area in the lower left of the station displays the current solution in use by the Fire Control system for the selected contact. There is no user interaction in the TMA Solution area. These fields display zeros until you have clicked ENTER SOLUTION in the TMA Trial Solution Area.

- ⇒ To change the solution in use by the system for the selected contact, alter the ruler to the desired position on the TMA Display or enter numbers directly into the trial solution area fields, then click the ENTER SOLUTION button again.

## **TMA ON RADAR/ACTIVE SONAR/VISUAL CONTACTS**

Contacts marked with active sonar, radar and the Stadiometer appear as a bearing/range pair on the TMA Display. The bearing line ends with a tiny triangle positioned at the range of the contact. If the target's bearing and range are known at two different times, as is the case with active sonar and radar, the solution can be found by connecting dots and 'drawing a line' with the ruler for course and speed.

A UUV in active mode provides returns from the location of the UUV in TMA and on the Nav and Fire Control maps.

- ✓ **Note:** Marking a contact with the periscope does not provide an automatic range. But using the Stadiometer to manipulate a photo of the visual contact can provide you with a range that is fairly accurate. See *Akula Stations/Periscope-Stadiometer Stations/Akula Stadiometer Station*. When visual or periscope contacts are referred to in this section, it is assumed that you have determined a range for the contact and marked it in the Stadiometer Station. The Periscope and Stadiometer Stations work hand in glove.

To determine a target solution for Active Sonar, Periscope or Radar Contacts:

1. Select a Contact ID from the SELECTED TRACK dropdown list

- Radar contacts have an R designation, visual contacts have a V designation, active sonar contacts have an S designation the same as passive sonar contacts.
- A bearing line appears on the TMA Display. A tiny triangle at the end of the bearing line indicates the target's range at time the contact was marked.

2. After a short interval return to the active sonar or radar station (whichever you are using) and mark the contact again. (When ON Radar Autocrew automatically marks contacts as long as the Radar is radiating.)
  - ⇒ For visual contacts, take another photo of the contact from the periscope and manipulate it in Stadimeter, then mark the contact again from the Stadimeter Station.
  - ⇒ Continue to mark the contact at two-minute intervals to accumulate several bearing lines. Toggle back and forth between the TMA and your chosen sensor.
3. Adjust the view on the TMA Display to get a clear view of the ruler and the range triangle.
  - ⇒ Move the ruler to the location of the range triangle, click the red button at the center of the display control arrows to center the ruler in the TMA Display, and then click the zoom buttons to better adjust the view. If you lose site of the ruler, zoom all the way out or click the red center on ruler button again.
4. Drag the arrowhead or tail of the ruler to adjust the tick marks along the bearing lines until the dots line up in the dot stack indicating a good solution.
5. Click the ENTER SOLUTION button to send the trial solution to the Fire Control system.

## **TMA ON PASSIVE SONAR AND ESM CONTACTS**

Determining a plausible solution is more complex when only a bearing is known, as is the case with passive sonar and ESM contacts. It takes more time and changes to Ownship course may be necessary to determine an accurate solution.

Passive sonar contacts with assigned trackers are updated automatically on the TMA Display. ESM contacts must be updated manually by repeatedly marking the contact at the ESM Station. Contacts detected by a UUV in passive sonar mode are displayed on a LOB from the location of the UUV on the TMA Display and in the Nav and Fire Control maps.

### **To perform TMA on passive sonar contacts:**

1. Select a Contact ID from the SELECTED TRACK dropdown list. A line of bearing appears on the TMA Display. The ruler appears at the default range of 10,000 yards on the most recent LOB with the arrowhead facing Ownship (or the UUV sensor if it is a UUV contact) with a default speed of 10. These default values appear in the trial solution fields directly to the right of the TMA Display.

✓ **Note:** No contacts appear in the drop-down lists if no contacts have been designated. Link contacts do not appear in the TMA track list.

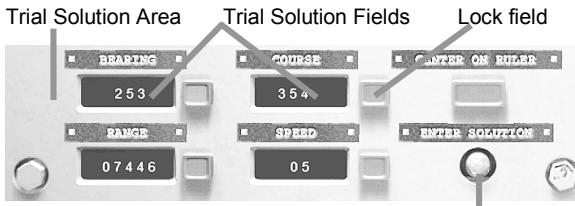
2. Adjust the ruler position to estimate the contact solution.

- ⇒ Position the end tick of the ruler on the oldest bearing line. (The end tick is on the oldest bearing line when the bottom dot is on the centerline of the dot stack.)
- ⇒ Click CENTER ON RULER then click the zoom buttons to adjust the view.
- ⇒ If you lose site of the ruler, zoom all the way out or click CENTER ON RULER button again.

✓ **Note:** The circular ruler handle is only visible when the ruler contains more than one tick mark or a speed of greater than 1 knot (kt) is set in the Speed field in the trial solution area. You must zoom way in on the ruler to see it at that speed. You can also set the speed to 10 knots or more temporarily. This will expand the ruler and reveal the handle.

3. Enter any known data in the trial solution fields.

- ❑ If you have additional data on the contact's range, or course, for example from an intelligence message, enter it in the appropriate solution field. If you have determined the contact's speed using DEMON, enter that speed in the speed field. See *Akula Stations/Akula Sonar Suite/Akula DEMON Sonar Station*. Click the digits to cycle through the values.
- ❑ If you are sure about one aspect of the solution (e.g. range) enter that value directly into the Range field then lock the field. That keeps you from dragging the ruler to a different range.
- ⇒ To lock a field, click the red button associated with the field. Lock buttons are located to the right of each trial solution label. These buttons are lit when the field is locked.



Click to enter the solution into the fire control system

4. Adjust the ruler on the display until the tick marks align well with the contact bearing lines and the dots appear to line up along the centerline off the dot stack.

- ⇒ Click the handle in the middle of the ruler to drag the entire ruler.
- ⇒ Click and drag on either end of the ruler to move just that end or to adjust the length of the ruler.

5. When a good match between the tick marks, the bearing lines and the dot stack has been achieved, click ENTER SOLUTION to send this information to the Fire Control system. The system tracks the

estimated position of the contact based on this system solution and uses that estimated location when targeting the contact.

- The entered system solution displays in the TMA SOLUTION panel at the lower right of the TMA station. To update the contact's system solution, adjust the ruler or directly input information in the trial solution fields and click ENTER SOLUTION again.

6. Changing Ownship's course and/or speed can refine the TMA solution. After steadyng on the new course and/or speed, adjust the ruler to achieve the best fit.

- If one TMA solution does not fit the entire observed bearing data, consider the fact that the contact itself may have changed course and/or speed (a contact "zig"). Attempt to achieve a better fit of the ruler by disregarding some of the earlier bearing lines and looking only at recent bearings.

## Merging, Splitting and Dropping Contacts

If the same contact is tracked by more than one sensor (e.g., a contact tracked by passive sonar and radar), the data can be merged into a "master" contact. (Master contacts have alphanumeric designations that begin with the letter M.) This can be very useful if you have a good range from one sensor (radar or active sonar) and a good bearing history from another (passive sonar).

1. Click the SELECTED TRACK drop-down and select one of the contacts to be merged.
2. From the MERGE TRACK drop-down select the track to be merged with the contact selected in the SELECTED TRACK drop-down list.
3. Click the MERGE button.
  - ⇒ To undo a merge, select the master contact (e.g. M01) from the SELECTED TRACK dropdown and click the SPLIT button.
  - ⇒ To drop the selected contact altogether, click the DROP button. Dropping a contact cannot be undone.

✓ **Note:** If the TMA Autocrew is activated, he does everything for you. You can make no TMA inputs yourself. For more information on your TMA Autocrew see *Akula Stations/Akula Autocrew*.

## TMA ON UUV SENSOR CONTACTS

In S.C.S. - *Dangerous Waters* all controllable submarines can carry Unmanned Underwater Vehicles (UUVs). These UUVs have sonar capabilities only and cannot launch weapons. For information on launching UUVs see *Akula Stations/Akula Fire Control Suite/Deploying and Wire-Guiding UUVs*.

The lines of bearing for contacts detected by a UUV are drawn from the location of the UUV at the time of the report, not from Ownship's location.

TMA on UUV contacts is performed as for any other sonar contact in active or passive mode.

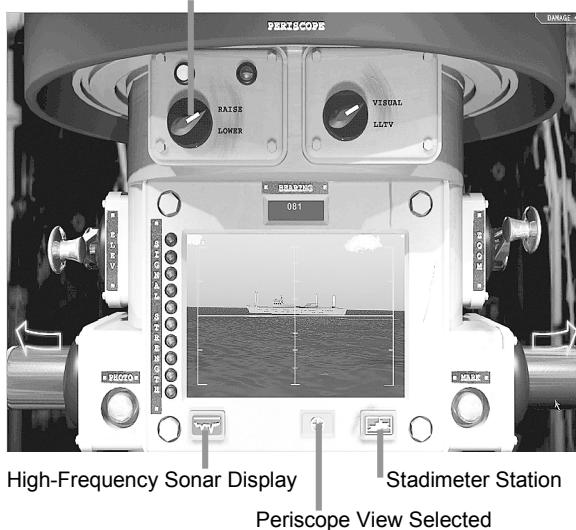
## AKULA PERISCOPE-STADIOMETER STATIONS [F8]

The Akula Periscope Station in S.C.S. - *Dangerous Waters* merges the functionality of the Periscope with that of the Stadiometer and also provides access to the High-Frequency sonar useful for navigating minefields.

The Stadiometer is only accessible from the Periscope Station.

- ⇒ Click the Stadiometer icon button to the lower right of periscope view to enter the Stadiometer station
- ⇒ Click ice icon button at the lower left of the periscope view to move to the High-frequency Sonar screen

Raise and Lower Periscope Mast



High-Frequency Sonar Display

Stadiometer Station

Periscope View Selected

## DETECTING CONTACTS WITH THE PERISCOPE

1. Ensure the ship is at periscope depth (20 meters) and at a speed of 10 knots or less if the sail is submerged. (Sea state affects periscope depth. If the seas are rough you may have to go shallower.)
2. Click RAISE to raise the periscope mast.
3. Rotate the periscope to look for contacts. Click the red arrows on the left and right periscope handles, or click and drag in the periscope view to rotate the periscope 360°.
4. Make use of the periscope's ESM sensor as you rotate the scope. This sensor can alert you to the presence of a contact before you can see it in the periscope view. The ESM indicator lights illuminate from the

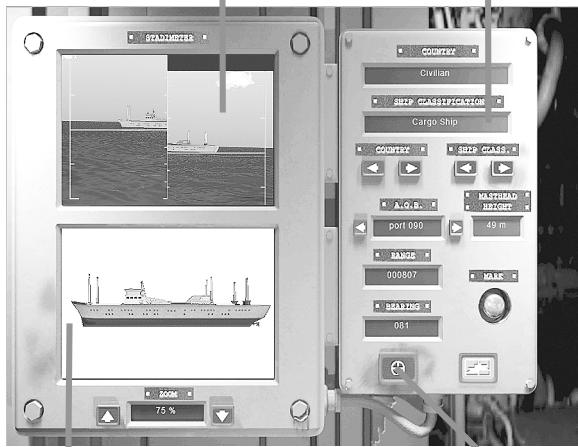
bottom up when a radar emitter is detected. (Green indicates a weak signal, red a strong one.)

5. Zoom and adjust the view. Center the view on the contact of interest. Zoom in and adjust the elevation as needed.
6. Click the upper half of the Zoom crank to zoom in. Click the lower half of the crank to zoom out.
7. Click the upper half of the Elevation crank to lower the elevation. Click the lower half to raise it
8. With a contact centered in the periscope reticule click MARK to assign it an alphanumeric designation and send the bearing information for the visual sighting to the Target Motion Analysis station and the Nav Map. Visual contacts have a V designation. (V01, V02 etc.) When marked by the periscope the contact symbol appears on a line of bearing at a default distance.
9. Center the contact in the middle of the periscope view. Align the horizontal line with the waterline before you take the picture. Click the PHOTO button to send a photo of the contact to the Stadimeter.

## AKULA STADIMETER STATION [F8]

The Stadimeter Station is accessible only from the Periscope station by clicking the Stadimeter icon button. The Stadimeter is used to manipulate a photo of a contact taken through the periscope to determine the contact's **range**. The Stadimeter can also be used to compare the photo to the ship's database of ship silhouettes to **determine its class** and **course**.

Click and drag to manipulate photo Silhouette in 3-D window



Silhouette of ship in Ship Classification field   Periscope Station

## **Determining Course with Stadimeter**

1. Take a photo of a contact in the Periscope Station [F8].
2. Click the Stadimeter icon button to switch to the Stadimeter Station.
  - When the Stadimeter Station appears, the last photo taken through the periscope appears in the upper window.
  - In the SHIP CLASSIFICATION fields the ship's computer provides the names of those ship classes within the selected country that are similar in length to the photographed contact. Each class name can be selected individually and the 3D silhouette for that class compared to the photo in the upper window.
3. Under COUNTRY click the right and left facing arrows to select a different country's platforms to view.
4. Under SHIP CLASS click the right and left facing arrows to cycle through the names in the SHIP CLASSIFICATION window to display the 3D silhouette for each available class. When a match is determined, leave the selected name in the SHIP CLASSIFICATION field.
5. Click the ZOOM arrows to match the size of the 3D silhouette with that of the photographed contact.
6. Rotate the silhouette by clicking the A.O.B. arrow buttons to closely match the aspect of the ship in the photo to help match the silhouette to the photo. Matching the aspect provides the Angle on the Bow (AOB) needed to determine a close approximation of the contact's course. Course is a piece of information needed in developing a firing solution in TMA.
7. Determine the reciprocal of the bearing to the contact shown in the Bearing readout. (If the value in the bearing readout is 0 to 180, **add** 180. If the value in the Bearing readout is 180 to 360 **subtract** 180.)
8. If the contact has a **port** aspect, **add** the number in the AOB window to the reciprocal. If the contact has a **starboard** aspect, **subtract** the number in the AOB window from the reciprocal.
9. If the resulting number is **greater** than zero and **less** than 360, this number is a good approximation of the course of the contact.
  - If the number is **greater** than 360, **subtract** 360. The resulting number is a good approximation of the contact's course.
  - If the number is **less** than zero, **add** 360 to it. The resulting number is a good approximation of the contact's course. Enter that number in the Course field in TMA when this contact is selected.

## **Determining Class/Range with the Stadimeter**

The following steps allow you to assign a classification to a contact and determine its range from Ownship.

1. Under COUNTRY click the right and left facing arrows to select the desired country's platform class names to view.
2. Under SHIP CLASS click the right and left facing arrows to cycle through the names in the SHIP CLASSIFICATION window to display the 3D silhouette for each available class.
3. Rotate the silhouette model by clicking the A.O.B. arrows. Click the Zoom buttons to alter the size of the silhouette in the window. When a match is determined, leave the selected name in the SHIP CLASSIFICATION field.
4. Click the side of the photo containing the contact's highest mast and drag that side of the photo such that the top of the highest mast is even with the waterline on the other half of the photo. The estimated range to the ship is displayed in the Range readout.
5. Click MARK. This sends the contact's bearing and range to TMA and the Nav Map.
  - ❑ The class name showing in the Stadiometer CLASSIFICATION field when the contact was marked is assigned to the contact.

✓ **Note:** The photo must be manipulated to determine a range when the contact is marked or no contact is created on the Nav Map or TMA.

6. Click the Periscope icon button to return to the Periscope Station view.

## AKULA UNDER ICE DISPLAY [F8]

The Akula's Ice Display is only accessible from the Periscope station. In S.C.S. - *Dangerous Waters* the Akulas are capable of operating and surfacing when under the ice. In order to surface under the ice it is necessary to locate an area of thin ice or open water called a polynya. Surfacing or attempting to surface in ice that is too thick can cause damage to your ship.

The Akula's High Frequency Display utilizes an upward looking High Frequency Acoustic Sensor and a Signal Strength Indicator to help determine ice thickness. When the display is set to Upward Looking mode, red indicates ice and black indicates no ice. The display is never a solid red when ice is present but has a mottled look displaying various shades of red. The darker areas are locations of thinner ice. The representation of ice at the center of the display indicates the ice directly over Ownship.

The row of colored lights beneath the display window is the Signal Strength Indicator. The strength of the signal returning from your acoustic sensor indicates the thickness of the ice directly above Ownship. Signal strength is represented as a color indicating ice thickness as shown below.

## **Signal Strength Indicator Lights**

Ownship cannot penetrate ice with a thickness greater than 10 feet. The lights in the Signal Strength Indicator represent the following ice depths and damage expectations.

**Green:** 0-4 feet thick; no Damage to Ownship.

**Yellow:** 4-8 feet thick; minor damage, may lose ice sensors.

**Red:** 8-10 feet or more; moderate to serious damage; may lose masts, flooding possible.

## **High Frequency Active Sonar (HFAS)**

The Akula's forward looking High Frequency Active Sonar (HFAS) shares this display screen.

- ⇒ Click **UPWARD LOOKING** in the Alignment Panel to view the Ice Display/
- ⇒ Click **FORWARD LOOKING** to view HFAS returns. For information on marking contacts with the HFAS see *Akula Stations/Akula Sonar Suite /Akula Active Sonar Station/ High Frequency Active Sonar*.

## **To Surface and Submerge Under the Ice**

Use the following procedure for surfacing and submerging under the ice

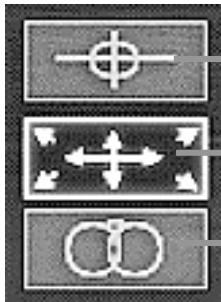
1. Use your ship's Ice Thickness display to locate a polynya in the ice as described above.
2. At a slow speed (1 – 2 knots) position the sub under the polynya then bring the sub to a complete stop.
3. From the Task Bar's Orders Menu select *Navigate>Set Depth>Surface* or set your depth at the Akula's surfaced depth of 11 meters.
  - ❑ You can tell that the ship has surfaced by selecting Ownship and looking in 3D view. The ship's sail emerges through the ice.
  - ❑ For those who prefer not to use the 3D view, check the depth readout to determine that you have achieved surfaced depth.
  - ❑ Once surfaced you can raise the periscope and view the ice field. Be sure to lower your periscope again before submerging to avoid damaging it.
4. To submerge the ship again, maintain a speed of zero and order a depth well below the thickness of the ice. Be sure to first retract any masts you may have raised!

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## AKULA SAIL BRIDGE (SAM LAUNCHER) [F9]

The Sail Bridge is only accessible when the Akula is surfaced. The Sail Bridge provides three views: Shoulder Mounted SAM Launcher, Free Look and Binoculars.

⇒ Click the desired icon button to switch to that mode.



SAM Launcher

Free Look

Binoculars

**Free Look:** The default view in the Sail Bridge provides a 360° naked-eye view of the area. Click and drag to pan the view.

**Binoculars:** Zoom to 16X by clicking the thumb wheel at the top of the screen. Click and drag to pan the view. VISUAL mode is selected by default. LLTV mode is available for night vision.

**SAM Launcher:** The Akulas carry SA-N-8 Gremlin surface-to-air missiles. A shoulder mounted SAM launcher is modeled in S.C.S. - *Dangerous Waters* and can be used to attack helicopters and low flying airplanes. The SAM launcher view provides a first-person shooter aspect to engage aircraft within range:

**SA-N-8 Gremlin:** Max Range: 4.7 km (2.5 nm); Max Altitude: 11,500 ft (3,505 m)

### LAUNCHING SURFACE TO AIR MISSILES

1. Surface the ship.
2. Press [F9] to access the Sail Bridge. This button is not enabled until the ship is on the surface or the sail is mostly exposed.
3. Click the SAM Launcher icon button.
4. Click and drag in the view to position the reticule on the target.
5. The interior Target Indicator bars turns red when there is a valid target centered in the reticule. Right-click to fire the weapon. It automatically reloads.

✓ **Note:** If you submerge the ship or heavy seas submerge the sail for long periods of time, the view moves to the Nav Map. The Sail Bridge is not accessible until the ship resurfaces.

## AKULA AUTOCREW

The Akula has five Stations with Autocrew assistants. This section describes what each crew does as well as what they don't do.

### AKULA BROADBAND/NARROWBAND AUTOCREW

When ON, the Broadband/Narrowband Sonar Autocrew searches Narrowband for contacts. Because they share trackers, contacts marked in Narrowband also display in Broadband. He also assigns trackers, classifies all marked contacts in Narrowband and assigns a Low, Medium, or High level of confidence in his classification. The level of confidence displays in the Navigation Station's DDI and above the 3D model when that contact is selected.

**Low level of Confidence:** Crewman has narrowed the possible classes to 4 or more and picks one at random

**Medium Level of Confidence:** Crewman has narrowed the possible classes to 2 or 3 and picks one at random

**High Level of Confidence:** Crewman has narrowed the possible classes to one

When this Autocrew is ON you can still mark contacts yourself and select different arrays and contacts for the crewman to analyze.

- ❑ **On the Nav Map:** Each contact marked by your Sonar Autocrew appears on the Nav Map as a colored line of bearing ending with a symbol. This is usually a yellow symbol for *Unknown* indicating both the category and ID for the contact is unknown. A contact designation number (S01, S02, etc) appears beside the symbol. As soon as your Sonar Autocrew has classified the contact, the symbol changes to that of the specified class. See *Navigation Station/2D Navigation Map/NTDS Symbols*. Selecting the contact symbol displays information about the suspected class in the DDI and the 3D model of that class appears in the 3D view surrounded by a bounding yellow bounding box and a level of confidence bar.
- ❑ **Your task:** Your Sonar Auto Crewman can classify a contact as a specific class, but he cannot determine its alliance. You must do that yourself on the Nav Map.
  - ⇒ On the Nav Map, click the contact to select it, then right-click the contact's symbol to display the Contact Menu.
  - ⇒ Select *Designate Category/ID>ID* and drag your cursor to select the presumed alliance ID for the contact.

## AKULA SONAR ACTIVE INTERCEPT AUTOCREW

When ON this Autocrew marks all contacts detected in Active Intercept. You have no additional responsibilities in this station when Active Intercept Autocrew is on.

## RADAR AUTOCREW

You must raise and lower the radar mast. When ON, your Radar Autocrew performs the following task as long as the radar is on:

- Marks contacts and re-marks them every minute that the contact can be detected. Contact range and bearing is sent to TMA and is reported on the Nav screen DDI when that contact is selected.
- Note:** The Radar Autocrew is not speedy. It takes a minute or two before he begins to mark contacts. When Radar Autocrew is ON, you cannot move the Radar cursor.

## AKULA FIRE CONTROL AUTOCREW

When ON, the Fire Control Autocrew performs the following duties:

- Uses information sent from the TMA station to establish presets for the selected weapon that are appropriate for the assigned target.
- Your Task:** It is still your responsibility to select a target, assign a tube, and fire the weapon from the Fire Control Launch Panel or by using the Contact Menu's *Engage With* command from the Nav. Your Fire Control Auto Crewman uses the contact's classification when determining presets. If you classify a contact as a surface ship when in actuality it is a submarine, the Autocrew enters presets appropriate for a surface ship.

- Note:** When the Fire Control Autocrew is ON you can set only Snapshot bearings and place waypoints in the presets. All other presets are greyed out.

From the stations of the Fire Control Suite [F6] weapons are selected, contacts are targeted, weapons are launched and countermeasures are deployed.

## AKULA TMA AUTOCREW

Accurate TMA takes time. Your TMA Auto Crewman requires data from several sensors and/or a change in Ownship's course to generate an accurate firing solution. When ON, the TMA Autocrew performs the following duties.

- ⇒ Click the AUTOCREW slider button in the upper left corner of the screen to toggle the state of the TMA Autocrew. Autocrew is ON when the silhouette is visible

- Uses information reported from all sensors to determine a firing solution. This solution is his best estimate of the course, bearing, range and speed of a contact.
- Merges contacts that represent the same track reported by different sensors.
- Keeps track of the movement of each contact and updates the solution on the Nav and Fire Control Maps with every new sensor input. The solution is updated immediately with his best guess whenever a contact is selected from the drop-down list in the TMA station.
- Once the crewman enters a solution for a contact, the contact then appears as a symbol on the Nav Map at the designated range and bearing and the solution is also sent to Fire Control for use in targeting. The yellow symbol for *Unknown* (platform category) and *Unknown* (ID) is displayed until you or the Sonar Auto Crewman classifies it.
- The Nav Map symbol for the contact moves on the map according to the course and speed set in the solution.

✓ **Note:** When TMA Autocrew is on, you can select specific contacts to view on the TMA Display, but you are not able to manipulate the ruler or the settings.

## *SECTION 12*

# *SEAWOLF STATIONS*



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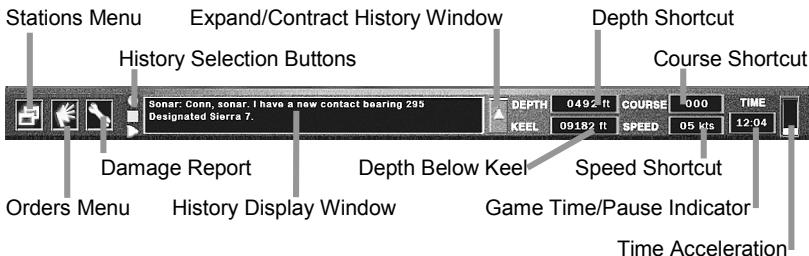
## 12: SEAWOLF STATIONS

The station and matrix button functionality of the Seawolf Class submarines in S.C.S. – *Dangerous Waters* is covered in this section. The Seawolf's five Autocrew features are covered at the end of the Seawolf section of the manual.

- ✓ **Note:** The default view when entering a mission is the Navigation Station. The Navigation Station with its 2D Nav Map and 3D view functions the same on every controllable platform and is covered only once in the manual. See *Navigation Station*. Some Nav Station information unique to the Seawolf is contained in the abbreviated *Seawolf Navigation Station* section later in this section.

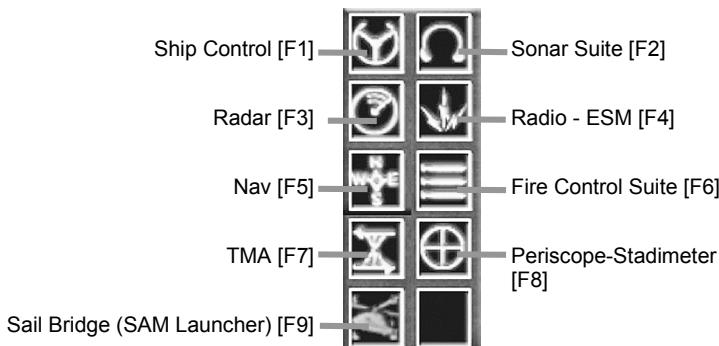
### SEAWOLF TASK BAR

The Task Bar for all submarines function the same. The differences are cosmetic. The Seawolf's Task Bar appears below.



### SEAWOLF STATIONS MENU

Click the Stations Menu button to expand the selection menu. Select an icon to jump to that station or use the appropriate function key. Selected menu items are orange.



## SEAWOLF ORDERS MENU

**Navigate:** Select various navigation orders for Ownship (OS.)

**Left Full Rudder:** Sets OS on a hard turn to port.

**Right Full Rudder:** Sets OS on a hard turn to starboard

**Rudder Amidships:** Sets the rudder back in the zero position.

**Set Depth:**

**Go to PD:** Brings OS to Periscope Depth (61 feet). If seas are high you may need to adjust the depth.

**Go Shallow:** Orders depth of 195 ft.

**Go Deep:** Orders depth of 1,671 ft.

**Go to Snorkel Depth:** Orders a depth of 54 feet.

**Change Speed:** Displays a submenu of engine order shortcuts. Given no strong currents in the area, selecting one of the following commands results in the indicated speed:

**All Ahead Flank:** Maximum speed for platform (40 knots.)

**All Ahead Full:** 20 knots.

**Ahead Standard:** 15 knots.

**Ahead 2/3:** 10 knots.

**Ahead 1/3:** 5 knots.

**All Stop:** Orders OS to a full stop.

**Back 1/3:** 4 knots in a reverse.

**Back 2/3:** 8 knots in a reverse.

**All Back Full:** 12 knots in reverse.

**All Back Emergency:** 16 knots in reverse.

**Arrays Wires:** Displays a submenu permitting you to stream, retrieve or stop the winch deploying the Port and Starboard Towed Arrays and the Floating Wire.

**Masts and Antennas:** Raise masts individually or lower all at once. Raising the masts while submerged can damage them if OS speed exceeds 8-10 knots. See *Appendix C: Submarine Max & Mins* for information on safe speeds for extending each mast while submerged. The Snorkel Mast option is only available when at snorkel depth (54 feet) or shallower. Raising the mast initiates ventilation. The ventilation process is secured from this menu or from the Ship Control Station via the VENTILATE button, automatically lowering the mast.

**Autocrew:** Displays a submenu of Autocrew options. Selecting an option toggles its state. A checkmark indicates that the Autocrew is ON. See

*Seawolf Stations/Seawolf Autocrew* for a full description of Autocrew functionality.

**Fire Tube:** This menu option only appears when there is a weapon loaded and ready to shoot. Weapons are loaded in the Fire Control Launch Panel and presets determined in the Fire Control Target Display.

**Countermeasures:** Launch either active or passive decoys. From the Orders Menu a depth of shallow (100 feet) or deep (800 feet) can be selected.

## DAMAGE REPORT WINDOW

Lists damage to any station. The text scrolls as necessary. When a station has damage, the damage indicator in the upper right of a station slides out to reveal a wrench. When the wrench is present on a screen, check the Damage Report Window for more specific information on the time required to repair the damage or notification that the damage cannot be repaired. Be aware that parts or all of a station will not work when damage has occurred.

⇒ Click the wrench button in the Task Bar to open/close the window.

## HISTORY WINDOW

Displays the type of history selected by buttons to the left of the window. The newest report appears at the bottom of the scrolling list.

**History Selection Buttons:** A lit button indicates the currently selected History type. If there is a new message in any other window, that window's selection button flashes until that button is selected.



- Crew Report History: Lists all orders as acknowledged by crewmembers
- Radio Traffic History: Lists all radio messages received.
- Multiplayer Chat History: Displays a history of multiplayer chat messages.

## MANEUVER SHORTCUTS AND GAME READOUTS

**DEPTH:** Keel depth reported in feet. Click/right-click digits to order a depth change.

**KEEL:** Readout of the depth of water below the keel in feet.

**SPEED:** In knots. Click/right-click digits to order a speed change. You cannot enter a speed that exceeds maximum speed for the class.

**COURSE:** Current course in degrees. Click/right-click digits to enter a new course.

✓ **Note:** Be aware that currents affect Ownship course and speed. It may not be possible to achieve the order course or speed if the currents are strong. Currents can be turned OFF/ON in the *Options>Game* page prior to mission start.

**TIME:** Displays the time of day in the mission based on a 24-hour clock. When the game is paused, the time display is replaced by the word PAUSED.

- ⇒ Press [P] to pause the game. Press [P] again to resume the game.
- ⇒ Click the numbers in the Time display to pause the game. Click PAUSED in the time display to restart the game.

## TIME COMPRESSION SCALE

In addition to real time, S.C.S. - *Dangerous Waters* supports four levels of time compression. The time scale displays in the far right of the Task Bar. A stack of colored bars represents the level of time compression.

- ❑ At real time, a single green bar is displayed.
- ❑ At twice real time a lime (yellow/green) bar appears above the green bar.
- ❑ At four times real time a yellow bar is added to the stack.
- ❑ At eight times real time an orange bar is added.
- ❑ At up to sixteen times real time (depending on system capability) a red bar appears at the top of the stack.
- ⇒ Press [.] or [,] or click/right-click on the scale to toggle through all the time scales

✓ **NOTE:** Time compression is not available in Multiplayer missions.

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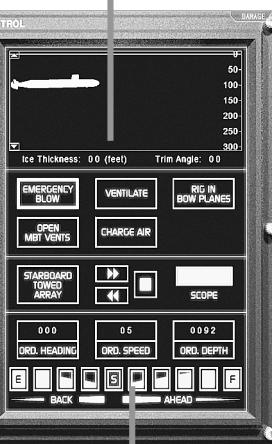
## SEAWOLF SHIP CONTROL STATION [F1]

The Seawolf's Ship Control Station is divided into two halves. The left half of the station provides mostly information. Only the Course Indicator and the Rudder Indicator allow for user interaction. The right side contains the Trim and Ice Display, the Engine Order Telegraph and the controls for the towed array and several ship systems.

Course Indicator



Trim and Ice Indicator



Rudder Control

Engine Order Telegraph

Seawolf's Ship Control Station employs the following conventions.

- A green outline (or green needle) and a finger cursor indicate that user input is possible in that location.
- Button text indicates what happens when you next click the button. Button text changes to facilitate this feature. The only exception is the Emergency Blow button. That button text is green when a blow is in progress and orange when it is **OFF**. The text does not change.
- An orange outline around a box or feature indicates no user input is possible. The two exceptions to this are the Rudder and Course Indicators.
- Orange text on a button indicates that ship system is **OFF** or closed.
- Green text indicates that the system is **ON** or functioning.
- In the Engine Order Telegraph the selected button is green.

Seawolf's Ship Control Station features are described briefly below.

**ORDERED DEPTH:** Displays the last ordered depth.

**ORDERED HEADING:** Displays the last ordered course.

**ORDERED SPEED:** Displays the last ordered speed.

**The Engine Order Telegraph:** Click the desired button to order engine speed. Engine speeds translate to ship speeds as defined in *Seawolf Stations/Seawolf Task Bar/Orders Menu*. Flank (maximum) speed for the Seawolf is modeled at 40 knots.

**HEADING:** Displays the sub's actual heading.

**SPEED:** Displays the sub's current speed.

**AIR %:** Displays the current charge level in the high-pressure air banks.

**DEPTH:** Displays the sub's current depth.

**SOUNDING:** Displays the current depth of the water under your keel.

**Course Indicator:** The orange needle indicates the ordered course. The green needle indicates the current course until ordered course is achieved.

- ⇒ Click the desired heading on the dial to order a new course.

**STERN/RUDDER/BOW:** Indicates the positions of the respective control surfaces of the ship. Zero represents a neutral setting for the bow/stern planes and the rudder. No user interaction is available in the Stern and Bow planes.

- ⇒ Click the desired number in the Rudder Indicator to order a rudder change.
- ⇒ Click zero in the Rudder Indicator or click in the Course Indicator to reset the rudder.

✓ **Note:** The ship will eventually turn in a circle if you do not reset the rudder to zero or order a specific course.

**ICE THICKNESS/TRIM ANGLE:** Shows the ice thickness profile when under the ice, displays the ship's current trim angle and displays the current depth beneath the hull when in shallow water.

- ❑ The submarine profile adjusts in the display window to match the ship's trim angle.
- ❑ When operating under the ice a profile of the ice thickness above Ownship appears across the top of the Trim Display. Any course change immediately redraws the profile. The Ice Thickness Readout in the lower left of the display reports the thickness of the ice directly above the sail. If you change your course, the display instantly updates to display the ice thickness on the new course. See *Seawolf Stations/Seawolf Ship Control Station /Seawolf Ice Thickness Display/Under Ice Operations* below.
- ❑ When the ship is traveling close to the bottom, an orange line indicates the depth directly under the Ownship's midpoint.

**EMERGENCY BLOW:** Click this button to perform an emergency main ballast tank blow to quickly surface the ship. The button text changes to green when a blow is in progress. Click the button again to return to the OFF (orange) position.

**OPEN MBT VENTS/CLOSE MBT VENTS:** When surfaced, click Open MBT Vents to open the main ballast tank vents and submerge your ship. The vents close automatically once the ship is submerged to a shallow depth. The vents cannot be opened again until the ship has resurfaced.

- ✓ Note: The ship dives/surfaces automatically when an appropriate depth change is ordered by means of the taskbar depth shortcut, the ORDERED DEPTH window from the Ship Control Station, or by means of an Order's Menu *Navigate>Set Depth* option. It is not necessary to manually open the MBT Vents.

**VENTILATE/SECURE VENTILATE:** Click Ventilate to commence ventilation. Click Secure Ventilate to stop ventilating. Ventilation is only necessary when you need to recharge the high-pressure air banks. (See Charge Air/Secure Air below.) The ship must be a snorkel depth (54 feet) or shallower to ventilate.

**CHARGE AIR/SECURE AIR:** Click Charge Air to start the charging the High Pressure Air Banks. Click Secure Charge to stop charging. You can charge the banks by only 10 % when submerged and not ventilating. You must be ventilating to fully charge the banks.

**RIG IN BOW PLANES/RIG OUT BOW PLANES:** The ship's bow planes are out by default. If you plan to surface when under the ice, you should rig in (retract) the bow planes as a precaution against damage. Click Rig in Bow Planes to retract the bow planes. Click Rig Out Bow Planes to return the planes to their normal position.

#### **Towed Array Controls:**

The Seawolf has two towed arrays the TB-29 and the TB-16. In general, the TB-29 is longer and more sensitive than the TB-16, but the TB-16 remains effective at higher speeds.

- ❑ Select the Starboard Towed Array to deploy the TB-29 array.
- ❑ Select the Port Towed Array to deploy the TB-16.

**Starboard Towed Array/Port Towed Array Toggle:** The visible name is the selected array.

- ⇒ Click the array name to toggle between the array options.
- ⇒ Click the right facing double arrows to deploy the selected towed array.
- ⇒ Click the left facing double arrows to retrieve the selected array.
- ⇒ Click the orange square to stop streaming or retrieving.

**Scope:** The scope progress bar illustrates the relative length of the array currently deployed.

#### **SEAWOLF ICE THICKNESS DISPLAY**

The Seawolf Ice Thickness Indicator is located in the Ship Control Station as part of the Trim display when ice is present. The line at the top of the display indicates the presence of ice and a general depth. The Ice Thickness readout in the lower left of the display indicates the Ice Thickness directly above the sail.

In order to surface safely through the ice you must locate a polynya, an open or thin area in the ice, and surface the ship there. Following proper procedures the sub can break through relatively thin ice. The Ice Thickness Indicator alerts you to ice that is too thick to break through. You must also be aware of ice keels, large slabs of ice that project downwards for many feet. With the High Frequency Active Sonar ice keels can be located and marked.

*Seawolf in S.C.S. – Dangerous Waters* cannot penetrate ice with a thickness greater than 10 feet. Possible damage when attempting to surface under ice following proper procedure is shown below:

- 0-4 feet thick: No Damage to Ownship.
- 4-8 feet thick: Minor damage; may lose ice sensors.
- 8-10 feet thick: Moderate to serious damage; may lose masts; flooding possible.

Do not attempt to surface under ice greater than 10 feet thick.

### ***Under Ice Operations***

Follow these steps to safely surface and submerge when operating under the ice:

1. Set Ownship speed to 1 or 2 knots.
2. Using the Seawolf's Ice Thickness display on the Ship Control Station, locate a polynya.
3. Position the sub under the polynya then bring the sub to a complete stop.
4. From the Orders Menu, select *Navigate>Set Depth>Surface* or set your depth at 27 feet.
  - You can tell that the ship has surfaced by selecting Ownship and looking in 3D view. The ship's sail emerges through the ice.
  - For those who prefer not to use the 3D view, check the depth readout to determine that you are surfaced (27 feet).
  - Once surfaced, raise the periscope and view the ice field. Be sure to lower the periscope again before submerging to avoid damaging the scope.
5. To submerge the ship again, maintain a speed of zero and order a depth well below the thickness of the ice. Be sure to first retract any masts that have been raised.

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## SEAWOLF SONAR SUITE

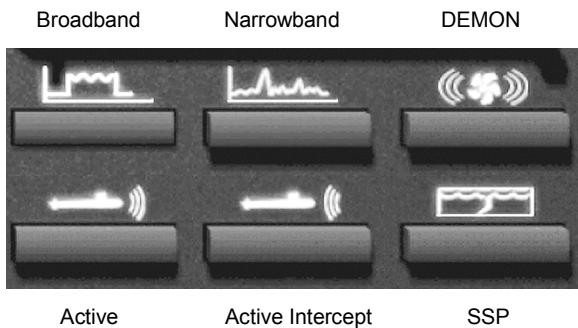
See *Training/Sonar School* for sonar information needed to efficiently use the sonar stations.

At the Sonar Stations you monitor the most important sensing equipment on board your submarine. Six displays, each with a specific purpose, help detect, identify, track, and localize contacts by employing either active or passive sonar. The sonar suite is composed of these six displays:

Broadband, Narrowband, DEMON, Active, Active Intercept, and Sound Speed Profile (SSP). All six stations are explained in this section.

Information about UUV sensors and their use is covered in *Seawolf Stations/Seawolf Fire Control Suite/Deploying and Wire-Guiding UUVs*.

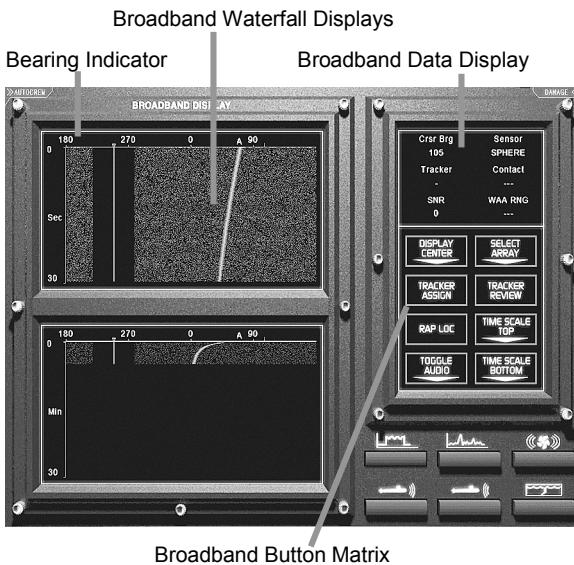
On all sonar stations six buttons are always visible and permit you to navigate from one Sonar station to another.



### SEAWOLF BROADBAND SONAR STATION

The Broadband Sonar Station displays input from the spherical bow and towed arrays. These inputs are used to detect and track submarines and surface ships. Here trackers can be assigned to contacts and they are given an alphanumeric contact ID. Contact IDs for all sonar contacts begin with the letter S. Trackers provide the TMA station with updates on the contact's bearing at specified time intervals.

- ✓ **Note:** UUV sonar contacts also have S designations, but their data is not reported in the Sonar Suite. UUV data is available in TMA and on the Nav and Fire Control maps.



## Seawolf Broadband Waterfall Displays

The Seawolf uses dual waterfall displays to track sonar information. In the waterfall display, sonar information 'cascades' down over time giving a sense of the contact's movement. Bearing is displayed on the horizontal axis with either north (000) or south (180) in the center. Time is displayed on the vertical axis, with the most recent information at the top.

Contacts appear as orange lines in the waterfall. A faint orange line represents a weak contact while a strong contact appears as a brighter, thicker line. The speckled background represents background noise interference. The amount of interference increases as background noise increases. The thin orange line beneath the  $\nabla$  indicator indicates the direction your sub's stern is pointing (your "baffles" for the spherical and hull arrays.)

Both the upper and lower waterfall displays show broadband sonar data. It is a good idea to have one display set on Short Time Average (1–60 seconds) and the other on Intermediate (0–30 minutes) or Long Time Averaging (0–2 hours). The longer the time averaging that is employed the better the sonar detection processing. However, the longer the time averaging, the longer the time between updates. Both the spherical sensor and the towed array pick up broadband data. The information displayed depends on which sensor is selected.

Ship speed greatly interferes with the ability of the sensors to detect and display contacts. Excessive speed results in the inability to detect any contacts at all. Only background noise is visible.

## **Assigning Trackers in Broadband**

1. Click SELECT ARRAY. From the resulting button matrix click SPHERE or TOWED to select the sonar array you want to view in the broadband display. Click BACK.
2. When a contact appears in the waterfall click on it to select it. A vertical cursor appears over the contact in the bearing indicator. You can click and drag this cursor along the bearing indicator.
3. Click Assign Tracker to designate the target and assign a tracker. (If the signal is faint, you may have to click more than once.)

A tracker letter is placed above the contact line. Four trackers are available for each sonar array.

A, B, C, and D: Spherical contacts.

E, F, G, and H: Hull contacts. (These trackers can only be assigned in Narrowband)

I, J, K, and L: Towed array contacts.

If the spherical array already has four contacts assigned to trackers (A-D) and you designate a new contact, the oldest tracker is unassigned from its current contact and reassigned to the new contact. This is also true for the hull and towed arrays. To unassign a specific tracker, click on the letter and drag it into the waterfall display and release it.

Each contact you designate is assigned a sequential *Sierra* number: S01, S02, S03, etc. The Sierra number, also called a Contact ID or Track ID, and all available data on the contact are automatically sent to TMA and the Nav Map.

## **Towed Array Contacts**

If the towed array is not already deployed at mission start, stream it from the Ship Control Station [F1]. No towed array contacts appear if the towed array is not streamed. Be aware that towed array contacts do not appear immediately when you deploy the array

Because of the physics of the towed array construction, an ambiguous contact, a mirror image of each true contact, appears on the display along with the true contact. If you have a contact at a bearing on your bow array, you can be fairly certain a contact at the same or nearly the same bearing on your towed array display is on the contact's true bearing.

If the contact is not visible on another array, changing the course of Ownship allows you to determine which bearing is the actual and which is its mirror image on the display. After you maneuver, one contact remains at a consistent bearing and one appears to move in the display. The contact's true bearing is that of the contact that remains constant.

When numerous contacts are present or the contacts are close together, this process can be very challenging.

✓ **Note:** Be aware that when you turn Ownship your towed array does not begin to turn until it reaches the point in the ocean where the ship began its turn. As a result, Ownship appears as a contact on the towed array during turns.

## **Seawolf Broadband Data Display/Button Matrix**

The components of the Seawolf's Broadband Data Display and Button Matrix functionality are covered here.

### **Broadband Data Display Fields**

**Crsr Brg:** Indicates the bearing at the location of the cursor in the Broadband Search Display or of the tracker when a tracker is selected with the Tracker Review button.

**Sensor:** Indicates which sensor is currently selected: Sphere or Towed.

**Tracker:** Displays the tracker letter assigned to the selected contact.

**Contact:** Displays the Contact ID assigned to the selected tracker or contact.

**SNR:** Displays the Signal to Noise Ratio at the location of the cursor. SNR indicates the relative strength of the signal.

**WAA RNG:** If acoustic conditions are favorable, Seawolf's Wide Aperture Arrays (WAA) can provide limited range information for contacts within 15,000 yds of Ownship.

⇒ Drag the cursor over a broadband contact in the Broadband Display to display a readout of the range to the contact as determined by the WAA. If the contact is out of range nothing appears here.

### **Seawolf Broadband Button Matrix**

**DISPLAY CENTER:** Displays button options for setting the center of the waterfall display to North (000 degrees) or South (180 degrees).

**SELECT ARRAY:** Displays button options for selecting which sensor data will be displayed in the waterfall: Towed or Sphere.

**ASSIGN TRACKER:** Clicking here assigns a tracker to the contact at the location of the cursor.

**TRACKER REVIEW:** Displays contact information in the Data Display for each assigned tracker. Repeated clicks cycles through all trackers.

**RAP LOC:** Rapid Localization. Click to send any available WAA range information on the selected sonar contact to TMA. A tracker must be assigned to the contact. The range information appears on the next TMA bearing line for the contact.

□ Seawolf's Wide Aperture Arrays (WAA) can provide limited range information for contacts that are within 15,000 yards when conditions permit.

**AUDIO:** Displays buttons to toggle the broadband audio ON and OFF. When ON, the sound produced by a broadband contact is audible when it is selected in the Broadband Display.

**TIME SCALE TOP:** Displays button options for setting the time average in the upper Waterfall Display: Select STA, ITA, LTA (see below).

**TIME SCALE BOTTOM:** Displays button options for setting the time interval in the bottom Waterfall Display: Select STA, ITA, LTA (see below).

**STA** = Short Time Average

**ITA** = Intermediate Time Average

**LTA** = Long Time Average

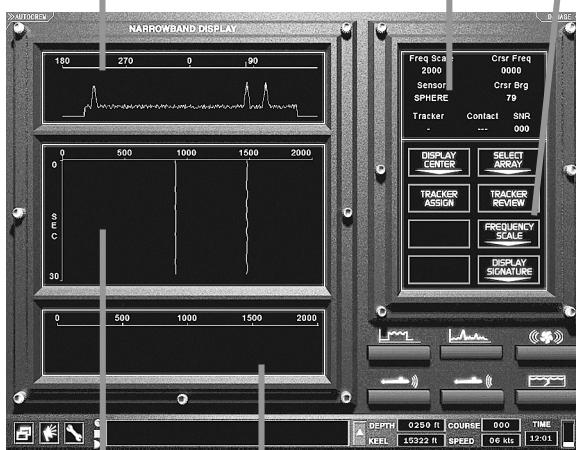
**Sonar Selection Buttons:** Click the button of the sonar station you want to visit. Hold your cursor over a button to display the name of the station it represents.

## SEAWOLF NARROWBAND SONAR

Each ship class has a unique sound frequency signature. The Narrowband function is used to classify sonar contacts by comparing the frequency signature of the selected contact against a database of known frequency signatures.

The ship's computer narrows your search by presenting only those signatures that have similarities to the signature of the selected contact.

Narrowband Search Display   Narrowband DDI   Button Matrix



Narrowband Waterfall   Ship Classification Window

## Seawolf Narrowband Displays

On the left side of the Narrowband station are three display windows. These are (from top to bottom): the Narrowband Search, the Narrowband Waterfall Display and the Ship Classification window. Each is described below.

**NARROWBAND SEARCH DISPLAY:** On the Narrowband Search Display signals from the selected array display in an A-scan format. A contact's signal displays as a spike at the bearing where it is detected. The height of the spike represents signal strength. High peaks indicate strong signal strength.

- ✓ **Note:** Ownship's speed can affect your ability to detect contacts in Narrowband. When the entire signal line is near the top of the display this indicates that background noise is very high. This usually happens when your speed is over 5 knots for hull array contacts or over 15 knots for towed array contacts. Decrease your speed to reduce water flow over the array.

**NARROWBAND WATERFALL DISPLAY:** The Narrowband Waterfall Display separates a signal from the bearing selected in the Narrowband Search Display into discrete frequencies. The horizontal axis represents the range of frequencies and the vertical axis represents time in seconds. The frequency range is adjustable using the frequency scale as described below. Vertical lines represent specific frequencies in the sound signal emitted by the selected contact. Together all of the frequency lines represent that contact's sonar signature.

- ✓ **Note:** Straight lines indicate a consistent signal. Curved or wavy vertical lines represent distortions or variations in the signal.

**SHIP CLASSIFICATION WINDOW:** This window displays the sound signature of the class or weapon named in the Profile Selector. Click **DISPLAY SIGNATURE** in the Button Matrix to access the Profile Selection Panel and the Profile Selector. See *Display Signature* in the Narrowband Button Matrix section below.

## Seawolf Narrowband Data Display

**Freq Scale:** Displays the frequency scale currently set in the Narrowband Waterfall Display and the Ship Classification Window. This range is selected using the Frequency Scale button in the Narrowband Button Matrix.

**Crsr Freq:** Displays the frequency at the location of the cursor in the Narrowband Waterfall Display.

- ⇒ To select a signal, click the desired line in the Narrowband Waterfall display. The cursor moves to that location in the horizontal frequency display above the waterfall and the frequency at the cursor location displays in this field.

**Sensor:** Displays the name of the selected array. Use the Select Array button in the Button Matrix to select a different sensor.

**Crsr Brg:** Displays the location of the cursor in the bearing indicator at the top of the Narrowband Search Window.

**Tracker:** Displays the assigned tracker letter of the selected contact when the Tracker Review button is clicked on the Button Matrix.

**Contact:** Displays the contact ID of the contact selected when the Tracker Review button is clicked on the button Matrix.

**SNR:** (Signal to Noise Ratio) This field displays the SNR of the selected contact. A high number indicates a strong signal.

### **Seawolf Narrowband Button Matrix**

The Seawolf utilizes a button matrix on many ship stations. Buttons containing a down arrow display a second panel providing options related to the button text. Buttons with no down arrows perform the described function when clicked. Click BACK to return to the previous matrix.

**DISPLAY CENTER:** Displays a panel for setting the center of the Narrowband Search Window to either North (000) or South (180).

**SELECT ARRAY:** Displays a panel for selecting which sensor's signals are displayed in the Narrowband Search window. (Sphere, Towed, Hull.)

- ✓ **Note:** The towed array must be deployed before any towed array signals can be detected. The Towed Array is deployed in the Ship Control Station.

**TRACKER ASSIGN:** Click to assign a tracker to the frequency line selected in the Narrowband Waterfall Display.

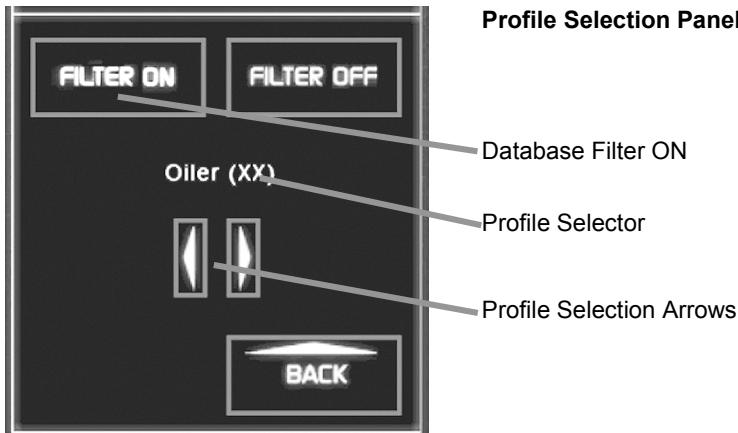
- ✓ **Note:** If the signal is weak you may have to click more than once to designate the contact and assign the tracker. You cannot assign a tracker while the game is paused.

**TRACKER REVIEW:** Click this button to cycle through all trackers assigned in Narrowband on the chosen array. Information on each tracker is viewed in the Data Display in the Cursor Frequency, Cursor Bearing, Tracker, Contact, and SNR fields.

**FREQUENCY SCALE:** Displays a panel for selecting one of the following frequency ranges: 0 to 2000 (default), 1000, 500, 300, 150 and 50.

**DISPLAY SIGNATURE:** Displays the Profile Selection Panel. See below.

**Profile Selection Panel:** The ship's computer queries its database and provides you with the names of ship classes or weapons that have signatures similar to the currently selected contact. The names of these ship classes or weapons can be seen one at a time in the Profile Selector. The sound signature for the class named in the Profile Selector displays in the Ship Classification Window below the Narrowband Waterfall Display.



## Classifying Contacts in Seawolf Narrowband

1. Click on a contact in the Narrowband Search Display. Detected frequencies appear in the Narrowband Waterfall Display.
2. Click DISPLAY SIGNATURE to reveal the Profile Selection Panel. The profile of the class name that appears in the Profile Selector is displayed in the Ship Classification window below the Narrowband Waterfall Display.
3.  When the Profile Selector is set to FILTER ON it creates a list of platforms known to have a similar sound signature profile to that of the detected contact. When FILTER OFF is selected, all the ship and weapon profiles are available to view. This is a long list!
4.  If the detected signal is not strong enough the profile list may say NONE.
5. Click the left and right facing profile selector arrows to cycle through the available profiles.
6. Compare each ship's signature in the Ship Classification window to the signature of the selected contact in the Narrowband Waterfall display.
  - ⇒ To change the frequency range displayed in the Waterfall Display and the Ship Classification window, click the BACK then FREQUENCY SCALE. Select a range to compare the frequencies in that range.
7. When you find the profile that most closely matches the selected contact's sound signature, leave that name selected in the Profile Selector. Click BACK.
8. Click on one of the contact's frequency lines in the Narrowband Waterfall Display then click TRACKER ASSIGN. You may need to click more than once if the contact is weak.

- ❑ The contact is assigned a contact ID and the class name selected in the Profile Selector is assigned to the contact. (The class name appears in the Navigation Station DDI when the contact is selected and the 3D object for that class appears in the 3D view.)
- ❑ You must still assign an alliance ID and a level of confidence to the contact using right-click Contact Menu's *Designate Category/ID* option or the Contact Menu's *Classify Contact...* option.

**Sonar Station Navigation Buttons:** Click the desired button to move to that Sonar Station.

## SEAWOLF DEMON SONAR STATION

DEMON is an acronym for Demodulated Noise. The DEMON function is used primarily to determine a contact's speed. This is important information when establishing an accurate firing solution and once determined at the DEMON Station the value can be entered in the speed field in the TMA trial solution field.

The main component of the DEMON Station is the DEMON Waterfall Display. The waterfall display separates the selected signal into demodulated components. On the display, the horizontal axis represents frequency and the vertical axis represents time. When a contact is selected its signal appears as parallel vertical lines in the waterfall. The lines represent sound generated by the contact's propeller blades.

Select the first line



To determine a contact's speed accurately you must have classified the contact in Narrowband, ESM or Stadimeter. The number of turns per knot produced by a specific class is listed in the USNI Information for that class. The steps for using DEMON to determine a contact's speed and how to use DEMON to determine a contact's category are shown below.

## **Using DEMON to Calculate a Contact's Speed**

1. First determine the class of the contact in the Narrowband, ESM or the Stadiometer Station. In the USNI Brower, find the entry for the ship or sub's class and make note of the turns per knot number listed in the TPK field.
2. Ensure that there is a tracker assigned to the desired contact in Broadband sonar.
3. Click SELECT ARRAY. A panel containing array buttons appears. Select the TOWED or SPHERE array. The selected button is green. Click BACK.
4. Click TRACKER REVIEW until the Contact ID and tracker letter for the contact you want to analyze appear in the DEMON Data Display. Lines appear in the DEMON Waterfall Display

✓ Note: If the game is paused, no lines appear in the waterfall display.

5. If necessary, adjust the frequency to better view the signal. If the lines in the display seem to blur together, switch to a lower frequency range. If the lines run off the right edge of the display, increase the frequency range.
  - ⇒ To adjust the frequency range, click **FREQUENCY SCALE** in the button matrix. A panel with frequency options appears. Click the desired scale. Click **BACK**.
6. Click above the line farthest left in the Waterfall display to select it. A vertical line above the contact indicates the line is selected.
7. Click TURNS PER KNOT in the button matrix.
8. In the panel that appears, click either INCREASE T.P.K. or DECREASE T.P.K. as necessary to set the desired TPK value. The TPK value entered is seen in the Data Display in the Turns Per Knot field. The speed for the designated TPK is displayed in the Speed field in the Data Display.
9. When you have determined the speed of the contact, enter that speed in the TMA SPEED field for the selected contact on the TMA Station.

## **Using DEMON to Determine Category**

By determining the number of blades on a contact's propeller, listening to the sounds it emits and observing the contact's behavior you can make an educated guess as to the category of the contact.

1. Select a sonar array as described above.
2. Click TRACKER REVIEW to select the desired contact. Vertical lines appear in the waterfall if a tracker is assigned and still reporting. The first line on the left indicates the shaft rotation speed. The other lines indicate individual blades on the propeller.

3. If necessary, adjust the frequency scale until the lines display clearly and individually on the waterfall.

Use the following criteria to help categorize the selected contact:

**Merchant Vessels/Tankers:** Typically three or four blades; noisy; often maintains predictable course.

**Warships:** Typically four or five-bladed propellers; quieter, smoother sound than merchant ships; possibly unpredictable course changes.

**Submarines:** Five, six or seven-bladed propellers; very quiet when submerged and at low speed; unpredictable course changes.

**Fishing Vessels/Trawlers/Pleasure Craft:** Three- or four-bladed propellers; noisy; erratic courses and speeds, frequently stopping and starting.

- ✓ **Note:** Turns per knot for military and civilian ships are found in USNI Reference. Click **CIVILIAN** in the Country column then the name of the ship type to find TPK information on Civilian ships.

## **Seawolf DEMON Display**

Seawolf's DEMON Data Display fields are described below

**Turns Per Knot:** Displays the number of turns currently set using the Turns Per Knot button in the DEMON button matrix.

**Speed:** Displays the speed of the contact as calculated using the Turns Per Knot button in the DEMON button matrix.

**Tracker:** The tracker letter of the selected contact appears in this field when the Tracker Review button is clicked in the DEMON button matrix.

**Contact:** The alphanumeric Contact ID displays in this field when the Tracker Review button is clicked in the DEMON button matrix.

**Crsr Freq:** Displays the frequency at the location of the cursor in the DEMON waterfall display.

**Bearing:** Displays the bearing of the selected contact when the Tracker Review button is clicked in the DEMON button matrix.

**SNR:** Signal to Noise ratio of the selected contact.

## **Seawolf DEMON Button Matrix**

**SELECT ARRAY:** Displays a panel for selecting which sensor's signals are displayed in the DEMON Waterfall when the Tracker Review is clicked (Sphere or Towed.)

**TRACKER REVIEW:** Clicking this button cycles through the contacts that have trackers assigned in the Broadband Station. Contact information displays in the DEMON Data Display in the Tracker, Cursor, Bearing and SNR fields.

**FREQUENCY SCALE:** Displays a panel for selecting the frequency scale in use in the DEMON Waterfall. (20, 50 or 120)

**TURNS PER KNOT:** Displays a panel for adjusting the Turns Per Knot setting for the selected contact. (Increase T.P.K. and Decrease T.P.K.)

## SEAWOLF ACTIVE SONAR STATION

Active sonar should be used only when absolutely necessary since it provides the enemy with a wealth of information. *S.C.S. - Dangerous Waters* models both medium and high frequency active sonar for the Seawolf class submarines

### Medium Frequency (MF) Active Sonar

The bow array in active mode is used to detect and track contacts. Echoes from a single ping or a series of pings are used to determine an object's bearing and range. Information from a medium frequency active search is sent to the TMA station for use in plotting a firing solution for the given contact. While this information is very useful to you, it comes at a price. Using active sonar gives away your bearing and alerts any ship in the area to your presence. The ship may well assume you have hostile intentions since active sonar is used primarily for targeting.

### MF Active Sonar Display

In the Seawolf 's rectangular Active Sonar Display, the area at the bottom of the display represents objects closest to your ship. The horizontal line across the top represents bearing. The display updates from the bottom up. In continuous mode each subsequent ping replaces the oldest data with the newest.

The display shows the results of active sonar echo ranging. Speckled areas represent echoes from the ocean background, reverberation, in general. The area of blank space represents the area behind your ship, active sonar baffles. Since the signals transmitted from the bow array cannot reach the area behind your ship, no echoes are returned from that area.

**Active Sonar Contacts:** Contacts appear as bright green spots on the active display. A metallic ring is heard as each contact displays. The active display shows a four-ping history, which is useful in detecting contacts with weak signal strength

**The Bearing-Range Cursor:** The cursor in the active display consists of a square attached to a vertical line that indicates a specific bearing. The distance of the cursor from the bottom of the display represents its range from Ownship. The position of the vertical line on the Bearing Indicator represents the bearing of the cursor. To move the cursor, click the desired location on the display.

- ❑ To determine a contact's bearing and range without marking the contact, simply center the bearing-range cursor on the contact. The contact's bearing and range appear directly below the active display in the Crsr Brg and Crsr Rng fields. Range is given in yards.

## **Marking Contacts with MF Active Sonar**

1. Click RANGE SCALE then in the resulting matrix panel click number of the desired range to use in the active search: 5, 10, 20, 40, or 80 (Ranges are in thousands of yards.) Longer ranges are appropriate for the initial search. Once a contact is detected, you can adjust the range scale of subsequent transmissions to improve the accuracy.
- Selecting a new range halts continuous transmissions. You must click transmit again to resume transmissions.
2. Click DISPLAY CENTER then select NORTH or SOUTH to center the display on a bearing of either 000 or 180 degrees. Click BACK.
3. Click TRANSMIT TYPE then select SINGLE or CONTINUOUS pings. If Single is selected, only one active sonar ping is transmitted. When Continuous is chosen, active sonar pings are transmitted at a set interval until the switch is reset to Single or you change the range scale.
4. Click TRANSMIT to send transmissions of the selected type. The name of the selected transmission type displays in the Active Sonar DDI in the Transmit field. It may take a few seconds for the first returns to appear.

 **Note:** To stop the transmission, click again on the TRANSMIT button.

- A valid contact gives consistent visual returns that are brighter than background noise or reverberations. The audio return will have a distinctive metallic ring to it and will be distinguishable from the background noise.
5. Click on a contact to select it with the Bearing-Range cursor or click and drag the cursor to center it on the contact. The contact's range and bearing display in the Crsr Brg and Crsr Rng at the bottom of the Active Sonar display. Range is in yards.
6. Click MARK to assign alphanumeric Contact ID to the selected contact. Once a selected contact has been marked once, marking it again sends an update of the contact's range and bearing to TMA and the Nav Map.
7. The NTDS symbol for contacts marked with Active Sonar appear on the Nav Map on the detected bearing and at the detected range at the end of a green line of bearing (LOB)
8. If desired, click DESIGNATE TARGET to assign a Contact ID and a tracker to the contact. The tracker automatically sends updated information for the contact to TMA as long as there is a continuous active sonar transmission. The ID and tracker are not assigned until after the next ping.

 **Note:** The spherical array has only four trackers. If you have all four trackers assigned in Broadband or Narrowband and designate a

target in Active Sonar, the oldest tracker is removed from a Broadband or Narrowband contact for use in Active.

## Seawolf Active Sonar Data Display

The fields of the Data Display above the Button matrix are briefly described here.

**Tracker:** Displays the tracker letter of the selected contact when the (tracker) Review button is clicked in the button matrix.

**Contact ID:** Displays the Contact ID of the selected tracker when the (tracker) Review button is clicked in the button matrix.

**Trkr Brg:** Displays the bearing of the contact that is assigned to the selected tracker when the (tracker) Review button is clicked in the button matrix.

**Trkr Rng:** Displays the range of the contact that is assigned to the selected tracker when the (tracker) Review button is clicked in the button matrix.

**Frequency:** Displays the type of frequency selected with the FREQUENCY button on the button matrix: Medium or High. Medium is selected by default.

**Transmit:** Displays the type of transmission to be produced when the Transmit button is clicked: Single or Continuous. The type of transmission is selected via the TRANSMIT TYPE button on the button matrix.

## Seawolf MF Active Sonar Button Matrix

The functionality of the active sonar button matrix is described briefly below.

**DISPLAY CENTER:** Click to display options for setting the center of the Active Display. Select NORTH to center the display at 000. Select SOUTH to center the display at 180.

**FREQUENCY:** Displays options for selecting either MEDIUM or HIGH frequency sonar transmission.

**DESIGNATE TARGET:** When the cursor is over a valid contact, clicking this button assigns a tracker to the contact and also assigns it an alphanumeric contact ID (S01, S02 etc.) Data on the contact is sent to TMA and the tracker automatically sends updates to TMA as they are received.

**REVIEW:** Cycles through all assigned trackers. Information pertaining to the selected tracker appears in the Data Display.

**MARK:** Assigns a contact ID and sends data on the selected contact to TMA and the Nav Map. No tracker is assigned.

Ensure that the cursor is centered on the most recent return from the contact and click MARK. If you are in single ping mode it makes more sense to use the Mark function rather than the Designate Target feature so as not to waste a tracker.

**RANGE SCALE:** Displays options for setting the maximum range in the Active Display. Numbers are in thousands of yards (5, 10, 20, 40, 80).

**TRANSMIT TYPE:** Displays options for selecting the type of transmission you want to send: Single ping or continuous ping. Continuous transmissions continue to ping until you stop it. This selects only the type of transmission. It does not transmit the signal.

**TRANSMIT:** Click to transmit a signal of the type selected with the Transmit Type Button. The type of transmission that is selected displays in the Transmit field in the Active Sonar Data Display. To stop a continuous ping, click Transmit, again.

## **Seawolf High Frequency Active Sonar**

High Frequency active sonar (HFAS) has a shorter range and can detect smaller objects than medium frequency active sonar. When you must navigate a minefield, HFAS can be used to locate and mark mines near your ship. Once a mine is located, maneuver quickly to avoid it by the largest possible margin. Driving slowly will give you the best reaction time. Marking the mines helps you keep track of the location of the mines should you need to traverse the field again when you leave the area. One method to find a safe route is to follow another ship's path. HFAS is also useful for avoiding dangerous ice ridges during under ice operations.

A single ping is not appropriate for mine avoidance therefore high frequency active sonar transmits continuous pings. Always keep in mind that many ships and submarines can detect any active sonar transmissions.

The Seawolf's HFAS is accessed from the Active Sonar station via the FREQUENCY button. Fewer functions are available in High Frequency mode. Marking contacts in this mode places markers on the Nav Map but does not assign a Contact ID or send information to TMA. Marking any contact in the HFAS Display marks ALL contacts detected within range. You may need to zoom in on the Nav Map to see all of the contacts that were marked.

Seawolf can detect contacts up to 5000 yards with the HFAS sensor. High frequency returns provides an outline of ice keels making it a valuable tool for under ice operations as well as navigating mine fields. The Ice Thickness silhouette in the Ship Control Station is also helpful when operating under the ice.

## **Marking Contacts with HF Active Sonar**

1. Click FREQUENCY in the Active Sonar button matrix. The frequency options appear in the matrix.
2. Click HIGH then BACK. The HFAS button matrix appears.

✓ **Note:** Continuous pings are transmitted as soon as HIGH is selected and any detected contacts appear in the Active Display immediately.

You must click BACK to access the HFAS button matrix and the MARK button.

3. Click MARK once. A marker is placed on the Nav Map for each contact detected by the sensor
  - ✓ Note: It is not necessary to select contacts with the Bearing/Range cursor to mark them or to click more than once.
4. To return to the Medium Frequency Button Matrix, click FREQUENCY on the button matrix to display the Frequency options.
5. Click MEDIUM then BACK.

## **SEAWOLF ACTIVE INTERCEPT SONAR STATION**

The Active Intercept function alerts you to the presence of active sonar transmissions from another ship, sub, dipping sonar or sonobuoy in the area. It provides the bearing of the transmitting entity as well as the frequency of the detected emission, the age of the last signal and the strength of the signal. Knowing the signal strength can assist you in determining the relative proximity of the active sonar source.

When Active Intercept detects an active sonar ping, a line is seen on the Active Intercept Display on the bearing of the contact. The strength of the signal is represented as a continuum of colored lights directly below the display that move from green to red as the signal grows in strength.

### ***Seawolf Active Intercept Display***

The circular Active Intercept Display shows a representation of all detected active sonar signals. A line from the center of the circular display to its outer edge indicates the bearing of an intercepted signal. The thicker the line, the stronger the contact.

**Signal Strength:** Indicates the strength of the selected signal. Green indicates a weaker signal, red a stronger one.

### ***Seawolf Active Intercept Data Display/Matrix***

The fields of the Active Intercept Data Display are described here.

**Frequency:** Displays the frequency of the intercepted signal. (Active Sonar Frequency ranges can be found in the USNI Browser in the SENSORS entry.)

**Bearing:** Displays the bearing of the intercepted signal.

**Age:** Displays the time in seconds since the last signal.

**SNR:** Displays the Signal to Noise ratio for the selected contact.

**Interval:** Displays the interval between the last two signals.

**MARK:** The only button in the Active Intercept Button Matrix is the MARK button.

- ⇒ Click a contact line in the Active Intercept display to select the contact then click MARK.
- A Contact ID is assigned to the contact and the bearing information is sent to the Nav Map and TMA. Each time that the signal is selected and marked again the current bearing of that contact is sent to TMA.

## SEAWOLF SSP STATION (SOUND SPEED PROFILE)

The Sound Speed Profile (SSP) Station displays the speed at which sound is transmitted at various water depths in the area around Ownship. Ocean water typically forms distinct layers of density that can profoundly affect sonar transmissions. Warmer, less dense water forms the upper surface duct—below this, temperatures fall off sharply and density increases. The effect of this process is sound generated in one layer doesn't tend to transmit easily to the other layer, and vice versa. At the beginning of any mission, always check the depth of the layer at your location. See *Training/Sonar School/Underwater Sound Propagation* for more information on thermal layers.

The Sound Speed Profile is created from information returned from an Expendable Bathythermograph (XBT) probe. When launched, the probe reports depth and sound speed information in both graph and table format

### Launching an XBT probe

When you enter the SSP station the last received results are available. This step clears the existing profile and initiates a new XBT reading.

- ⇒ Click LAUNCH in the button matrix. The layer depth is reported in the Data Display
- Updated information does not appear instantly on the screen. The XBT probe rises to the surface and then descends before it begins reporting. This may result in a delay before the SSP updates. Wait for the XBT to reach the surface and drop
- To change the range seen in the graph, click Change Depth Scale, click the desired number then click BACK.

✓ **Note:** Due to varying water temperatures at locations around the world, a distinct thermal layer is not always present.

## SEAWOLF UUV SONAR

In S.C.S. - *Dangerous Waters* all submarines are given Unmanned Underwater Vehicles (UUVs). These UUVs act as remote sonar sensors. Merging TMA bearing information provided by a remote sensor with data from your ship's sensors can provide a fairly accurate assessment of the range to the contact. UUVs are particularly useful when navigating a minefield and can be operated in Passive or Active mode.

The UUV itself appears as a contact in the Broadband and Narrowband Displays but UUV sonar returns are not viewed in the Sonar Suite. UUV sonar contacts display on the Nav and Fire Control maps and in TMA.

UVUs are launched from the Fire Control Station and are wire-guided like torpedoes from there. See *Seawolf Station/Seawolf Fire Control Suite/Deploying and Wire-Guiding UUVs* for complete information.

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## **SEAWOLF RADAR STATION [F3]**

Submarine radar should be used with caution and only when the situation mandates its use. When you use radar you communicate your presence, your bearing, your proximity and who you are if the other platform is equipped with EW or ESM equipment.

### **MARKING CONTACTS WITH RADAR**

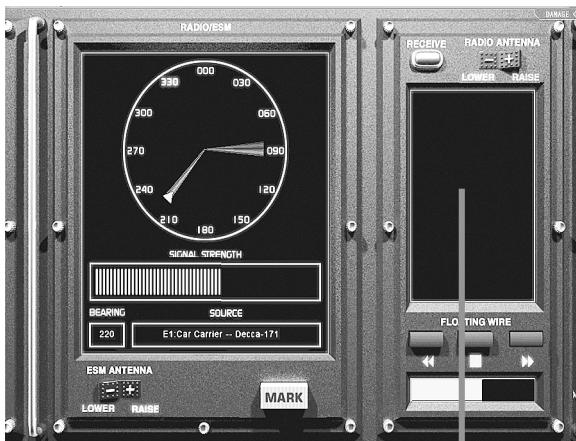
1. Ensure that Ownship is at Radar depth (51 feet) or less and moving at 8 knots or less if the sail is submerged.
2. Click RAISE in the RADAR MAST Panel in the upper right of the station to raise the mast. The READY light glows continuously when the radar mast is extended and radiating.
3. Click the desired button in the RANGE SCALE to set the radar sweep to that range.
4. If range rings are desired on the Radar display, click the desired button under RANGE RINGS to set the ring scale to that distance. Below the Radar Display click RANGE RINGS to ON.
5. Contacts show up as bright orange spots on the display. Click on a contact to select it with the Bearing-Range Cursor or click and drag the cursor to center it on a contact.
6. Click MARK to send the contact's bearing and range to TMA and the Nav Map.

✓ **Note:** Radiating while the mast is submerged destroys the radar.

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## **SEAWOLF RADIO-ESM STATION [F4]**

In S.C.S. - *Dangerous Waters* the Radio Room and the ESM (Electronic Support Measures) stations are combined. The radio is used to receive intelligence and tasking updates and update Link data while underway. The ESM console allows you to detect and classify contacts when the ESM console is extended.



Radio Message window

### **Seawolf Radio-ESM Station**

## **SEAWOLF ELECTRONIC SUPPORT MEASURES (ESM)**

The ESM mast is designed for the passive detection of radar emissions. This sensor detects any platform in your area that is employing radar. Because you must have the ESM mast is exposed, you make your ship vulnerable to detection when using ESM.

The left half of the Radio-ESM Station contains the ESM Display and controls. The ESM sensor provides a bearing to detected contacts. The ship's computer analyses the detected transmission and compares it to those in its database thus providing the class of the transmitting platform.

### **Detecting and Classifying Contacts with ESM**

1. Come to 58 feet (or less) and maintain a speed of 10 knots or less if the sail is submerged before raising the ESM mast.
2. Click the ESM ANTENNA switch to the RAISE position to raise the mast. When the triangular cursor appears in the ESM Display, the ESM is in detection mode. Contacts appear as a narrow wedge of lines emanating from the center of the display on a specific bearing.
3. Click a contact signal in the ESM Display to determine contact bearing and to view the source of the signal. The name of the detected emitter appears in the SOURCE field. The bearing to the contact appears in the BEARING readout.

Take note of the intensity of the contact on the ESM Display and the number and color of ESM Signal Strength Indicator lights that are lit. A

strong signal can indicate that the contact is relatively close. (Green indicates a weaker signal, red a strong one.)

4. Click a contact signal to select it then click Mark. This assigns an alphanumeric Contact ID to the contact and sends the bearing information to TMA and the Nav Map. ESM contacts have E designations (E01, E02, etc.) Once marked the Contact ID appears in front of the emitter name in the SOURCE field.
- When MARK is clicked, the contact selected in the ESM display is automatically assigned a classification determined by the ship's computer. This classification is based on platforms known to carry the detected emitter shown in the SOURCE field. When the contact is selected on the Nav Map the DDI will list that class name in the CLASS field. You must still assign an ID (Hostile, Friendly etc.) from the Contact Menu on the Nav Map.

## RADIO ROOM

The right side of the Radio-ESM console represents the Radio Room. Here messages containing important intelligence and tasking information are received and contact positions are downloaded from any platforms in the mission that are part of your Link network.

When your submarine starts a mission submerged, you see no Link data on the Nav Map even though Show Link Data is on by default. To determine if there are Ownside platforms (members of the Link) in your area you must come to communications depth (comms depth) and follow the steps below. When Link information is downloaded any surface and air Link participants and any contacts they have detected appear on the Nav Map. You may never see the symbol for any submerged Link participant that is in the mission.

## RECEIVING RADIO MESSAGES AND LINK DATA

To receive messages you must come to Communications Depth (Comms Depth) and raise the radio mast or stream the floating wire antenna. There are advantages and disadvantages to both modes. The radio mast receives messages more quickly but exposing the mast leaves you vulnerable to detection. The floating wire receives messages far more slowly but you do not need to expose a mast to receive messages. Follow these instructions to deploy the radio mast or floating wire.

1. Select either the floating wire antenna or the radio antenna mast to receive the message.

**Radio Mast:** Take the ship to **59 ft** and set ship speed to 10 knots or less when the sail is submerged to avoid damaging the mast when it is raised. In the Radio Antenna panel click RAISE to extend the Radio Mast.

**Streaming Wire:** You do not have to come to comms depth but it helps to be fairly near the surface. Set ship's speed to 18 knots or less to avoid damaging the wire. Slower speeds allow the wire to float up more

quickly. If speed exceeds 5 knots, the wire may never reach the surface of the water. Make sure the wire is streamed to at least half of its length in order to ensure message reception. Click right-facing double arrows to stream the floating wire. A progress bar indicates how much of the wire is currently deployed. Click the square (Stop) button to stop the winch. Click the left-facing arrows to retrieve the array.

2. Look at the message screen for incoming messages. A scroll bar appears in the message window if there are more messages than can be displayed at one time. The newest message traffic is always at the bottom of the scrolling text. Message traffic may not appear immediately. When a message is received, the INCOMING MESSAGE light glows briefly.
3. Look on the Nav Map if you are waiting for Link data to determine when the information has been downloaded.
  - ❑ Single player mode: If another Ownside platform in the mission is a submarine, you must both be at comms depth with a mast or the antenna deployed before you see him as part of your Link Data. Since it is unlikely that these conditions will be met, you may never see an Ownside sub in your Link download.
  - ❑ Multiplayer mode: If another Ownside sub is player driven, you *both* must be at comms depth with the radio mast extended at the same time before you will see each other. If you have your radio mast extended and he has his floating wire out, he will see you but you will not see him. The radio mast is needed to transmit position data.
4. After the desired information has been received, click LOWER to lower the Radio Mast or RETRIEVE to retrieve the streaming wire.

✓ **Note:** Radio message text also appears in the Radio History Window on the Task Bar. When a new message is received, the radio history selection button (the green square) on the Task Bar flashes until the button is selected. You can raise and lower the radio mast from the Task Bar's Orders Menu from any screen provided you are at a safe depth and speed.

## PROMOTING CONTACTS TO THE LINK

In some cases the Link participants in your area could be unaware of a contact that you have detected if the contact is out of range of their combined sensors. In this case you may want to promote your contact to the Link to share it with other Link participants in your area. (Your contacts are not automatically shared with the Link participants as theirs are shared with you in single player games.)

During Multiplayer games contacts detected by Ownside platforms controlled by other players do not share data across the link automatically as the AI Ownside platforms do. Part of your task in Multiplayer games is to promote your contacts to the Link so that other Ownside Link players can

see your contacts. Other players must promote their contacts before you are able to see them on the Nav Map. You are only able to see them when Show Link Data is on.

Just as you must raise your radio antenna or float the wire to download Link updates, you must also come to comms depth and raise the radio mast before you can promote your contacts to the Link.

1. Come to comms depth (**59 ft**) and raise the radio antenna.
2. From the Nav Map, select the contact you want to promote. From its Contact Menu (right-click menu) classify the contact as surface or subsurface if known and apply any alliance or class information that you have to the contact.
3. If possible, determine an accurate firing solution and enter it at the TMA station.
4. From the Contact Menu select Promote to Link. In the DDI a new field appears labeled "**Promoted**". This field displays the time in the mission at which you promoted the contact to the Link.

The contact's symbol appears on the Nav Map of all players in a multiplayer game that are part of Ownside and have access to the Link. A 4-digit track ID is assigned based on your Platform ID. This 4-digit number is seen in parentheses following the time of promotion in the "Promoted" field. In single player games, AI platforms attack contacts that you have promoted as hostile. The AI investigates contacts promoted as Unknown. See *Navigation Station/2D Navigation Map/Contact Menu/Promoting a Contact to Link* for full information on promoting a contact to Link.

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## SEAWOLF NAVIGATION STATION [F5]

The Navigation Station, with its Nav Map and 3D View is the default view when entering a mission. The Navigation Station functions the same regardless of controllable platform and is covered only once in this manual in Navigation Station.

The Navigation Station section covers how to play from the Nav, what is seen on the Nav Map and the 3D View and information on what is seen when various filters are applied. The Seawolf's Task Bar is covered in this section. See *Navigation Station*. Several options are unique to the submarines in S.C.S. – *Dangerous Waters*.

## SEAWOLF OWNSHIP/ORDERS MENUS

To access the Ownship Menu, click the Ownship NTDS symbol on the Nav Map to select it, then right-click on the Ownship symbol. The majority of the Seawolf's Ownship Menu items are identical to those in the Task Bar Orders Menu. See *Seawolf Stations/Seawolf Task Bar/Orders Menu* for a description of those menu items. The rest of the Ownship Options require the use of the Nav Map. These are the same from platform to platform. See

*Navigation Station/2D Navigation Map/Ownship Menu* for complete information.

**Fire Tube [X]:** This option appears in the Ownship Menu only when a target is assigned to a tube and the tube is readied to fire in the Fire Control Station. When all that is left to do is fire the tube, this option is available. Select it to fire the designated tube.

## SEAWOLF CONTACT MENU

The Contact Menu appears whenever you right-click on a selected contact's NTDS symbol. Most menu items are the same from platform to platform. See *Navigation Station/2D Navigation Map/Contact Menu*. Several options are unique to the subs in S.C.S. – *Dangerous Waters*.

**Engage With:** The weapons you will see in the Engage With menu are found in *Seawolf Stations/Seawolf Fire Control Suite/Seawolf Tactical Weapons* and the *Seawolf Strategic Weapons*. Only weapons appropriate to the selected target are available. Others are greyed out.

**Spec Ops:** This option is only visible when the mission designer has included the Deep Submergence Rescue Vehicle or a Special Forces team in the mission. It displays a submenu of Special Operations. Follow tasking messages in the mission for specifics on deploying the special ops units in the game.

**Deploy DSRV:** Select this option to Deploy the Deep Submergence Rescue Vehicle (DSRV) to travel to the selected contact. This option is only selectable when the following conditions are met:

- The DSRV is present on the Sub's hull. (The DSRV is only available if the mission creator added it to the mission.)
- The selected contact is a submerged submarine.
- Ownship depth is greater than periscope depth.
- Ownship speed is 3 knots or less.

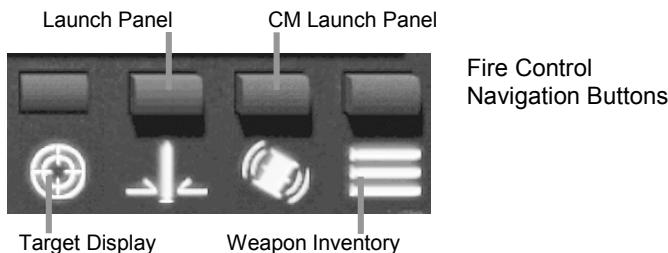
**Deploy Special Forces:** This menu is greyed out until speed and depth requirements are met. It is available only in the Contact Menu for surface ships and landbased (Category: Stationary) targets such as buildings or the floating Oil Rig, and only under these conditions:

- The selected contact is a surface ship or a landbased target (Category: Stationary) such as a buildings or the floating Oil Rig.
- Ownship has Special Forces aboard.
- Ownship is traveling at periscope depth or less and at 3 knots or less.

## SEAWOLF FIRE CONTROL SUITE [F6]

From the stations of the Fire Control Suite [F6] weapons are selected, contacts are targeted, weapons are launched and countermeasures are deployed.

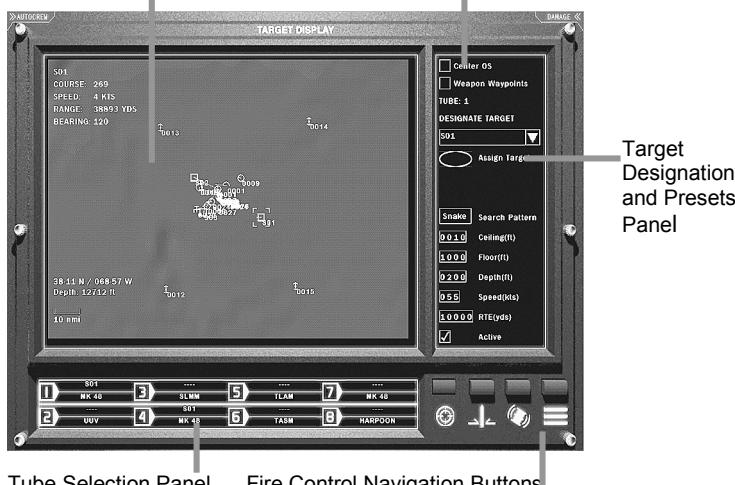
Seawolf has four stations in its Fire Control Suite: The Target Display, Launch Panel, Countermeasure Launch Panel and the Weapons Inventory. These are reached by clicking one of the navigation buttons at the bottom left of each of the Seawolf's Fire Control Stations.



### SEAWOLF TARGET DISPLAY

Seawolf's Target Display consists of the Fire Control map, the Tube Selection Panel and the Target Designation and Preset Panel. From the Target Display the weapon in a specific tube is targeted at a specific contact and weapon presets appropriate for the target are entered.

Fire Control Map      Fire Control Map View Controls



## Fire Control Map

All sensor contact symbols seen on the Nav Map are also seen on the Fire Control map. If you have Show Link Data on, Link participant symbols and Link contacts symbols also appear. The TMA or Link solution data for a selected contact appears in the upper left corner of the map in the Fire Control DDI area. This solution data is constantly updated assuming the course and speed designated when the solution was entered in TMA or provided by the Link. This information is used by the Fire Control System to predict the location of the target so the weapon can steer an intercept course until it is close enough to detect the target and begin homing.

You are allowed to target Link contacts as well as Link participants from the Fire Control Station, however the latter is not recommended. Link contacts are only available if you have first downloaded Link data. Link contact positions are not updated once you lose radio contact.

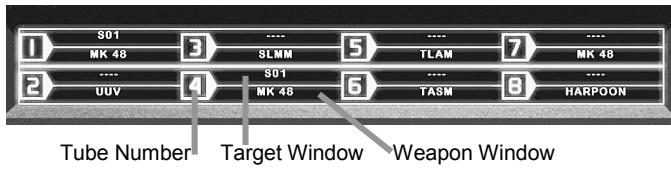
- ✓ **Note:** If Show Truth is ON, no Contact IDs appear in the Target Selection List. Only Snapshots (bearing only) can be assigned to a weapon.

## Seawolf Tube Selection Panel

The lower left of the Target Display contains the Tube Selection Panel. A number represents each of the Seawolf's eight torpedo tubes. Following each number are two small display windows. The lower window, the Weapon Window, displays the name of the weapon loaded in the tube. The upper window, the Target Window, displays the Contact ID or target assigned to the weapon. Dashes indicate that no target is assigned to the weapon in that tube.

⇒ Click a tube number to select it.

- ✓ **Note:** TLAMS and SLMMs are not assigned Contact IDs. Waypoints are placed on the map for the weapon to follow. **WYPT** appears in the Target Window when waypoints have been assigned to TLAMS or SLMMs. A UUV is a sensor and cannot be assigned a target.



## Target Designation and Presets Panel

The right side of the Target Display contains Target Designation and Presets Panel. The panel is divided into functional areas. The upper portion of the panel contains the Map View Controls Target Designation area. The following options are available.

**Center OS:** When this option is selected the map symbol for Ownship is always centered in the Fire Control map when the map is zoomed in.

**Weapon Waypoints:** When ON, all waypoints assigned to any land attack missile or mine display on the map. When this option is OFF only the waypoints for the weapon in the selected tube show on the map.

**Designate Target:** This drop-down list contains all of the Track IDs currently marked by Ownship and Link participant and Link contact Track IDs if Show Link is ON. A Track ID selected in this list is available for assignment to a specific tube as described below with the following caveats.

**Contact with a LOB:** Contact IDs for contacts with a line of bearing (no TMA solution) cannot be assigned to a tube. They can be targeted with a snapshot. See *Seawolf Stations/Fire Control Station/Seawolf Target Display/Firing A Snapshot*. Create a TMA solution for the contact to make it available for tube assignment.

**Unknown Category Contacts:** Track IDs for contacts that have a TMA solution but have not yet been classified as either a surface or sub surface platform type cannot be assigned to a tube. A snapshot can be assigned.

- ⇒ Select the contact in the Nav Map and from its right-click menu designate it as surface or subsurface to make it assignable.

- ✓ **Note:** No Contact IDs appear in the Designate Target list if Show Truth is on or if you have not yet marked any contacts with one of your sensors and no Link contacts have been downloaded.

**Assign Target:** Click this button to assign the contact selected in the Designate Target drop-down list to the tube selected in the Tube Selection Panel. The Contact ID appears in the Target Window for the selected tube.

- ✓ **Note:** Certain weapons can only be used against specific types of contacts. For example, you are not able to assign a sub-only weapon to a target designated as a surface contact. Until a contact is assigned a category (surface or subsurface), it cannot be assigned to any tube. Assign a category from the Nav Map by right-clicking the selected contact's symbol and selecting *Designate Category/ID>Platform Category*.

The lower portion of the panel displays the presets for the weapon in the selected tube. Presets vary depending on the weapon. See *Seawolf Stations/Fire Control Suite/Presets*.

## Assigning a Target to a Tube

1. Click the desired contact symbol on the Fire Control map or select the contact ID from the **Designate Target** drop-down list.
2. Click the number of a tube containing a weapon appropriate for the target. (If the weapon you need is not loaded in a tube, go to the Launch Panel and load the desire weapon. See *Seawolf Stations/Seawolf Fire Control Suite/Seawolf Launch Panel*.)

3. Click **Assign Target**. The Contact ID appears in the Target Window of the selected tube in the Tube Selection Panel.
4. Presets for the weapon in the selected tube appear in the lower portion of the Target Designation and Preset panel. Click or right-click on digits as needed to adjust the settings. For information on preset settings see *Seawolf Stations/Seawolf Fire Control Suite/Seawolf Presets*.

## **Firing A Snapshot**

When a contact does not yet have a TMA solution or has not yet been categorized as surface or subsurface, it can only be targeted with a snapshot. A snapshot is simply a weapon fired down the line of bearing to the contact. Since you have no range information you fire and hope that the weapon will home on the contact.

1. In the Tube Selection Panel click the number of the tube containing the desired weapon.
2. From the **Designate Target** Dropdown list, select SNAPSHOT
3. Click **Assign Target**. The Snapshot (Deg) preset appears above the other weapon presets.
4. Click or right-click the digits in the SNAPSHOT preset to enter the bearing to the contact. (Select the contact symbol on the Fire Control map to read the current bearing to the contact in the map DDI.)

## **Assigning Waypoints to a TLAM or SLMM**

1. Select a tube containing a TLAM or SLMM.
2. Click **Define Target Waypoints** in the preset area.
3. Click the Fire Control map to place the waypoints.
4. Click and drag a waypoint as needed to adjust its location and enter a destruct range for the weapon.

## **Assigning a UUV Sensor a tube**

Because the UUV is a sensor it is not assigned a target

1. Select a tube containing a UUV.
2. If a depth other than Ownship depth is desired, deselect *Use OS Depth* in the Preset Panel and enter the exact depth you want in the *Depth* preset that appears..
3. Launch the UUV from the Launch Panel

Once targets and presets are assigned, click the Launch Panel icon and fire the weapon from the Launch Panel.

## **Torpedo Wire Guide Controls**

Once a torpedo is fired, its symbol appears on the Fire Control map. When the weapon enables, two red lines extend from the torpedo symbol

indicating the weapons search cone. Until a torpedo enables, it can be wire-guided.

⇒ Click the torpedo's symbol on the Fire Control map.

The following Wire Guide Controls appear in the Preset area.

**Heading:** Click the right facing arrow to increment the weapon's ordered heading. Click the left facing arrow to decrease the ordered heading.

**Enable:** Click to enable the weapon before it reaches the enable distance set in the *Run To Enable* preset and start the weapon in search mode

**Pre-Enable:** Click to return an enabled weapon to its pre-enabled state without shutting the weapon down entirely. If you want to wire guide a weapon that has already enabled and started its search, click this option. The red enable cone disappears. Once the weapon detects a contact and begins homing, it can no longer be pre-enabled. It can only be shutdown.

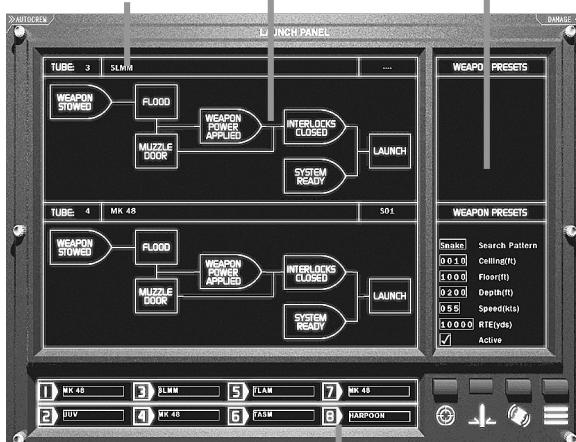
**Shutdown:** Click to shut down the weapon entirely. The weapon cannot be enabled again if this option is selected.

- ✓ **Note** A torpedo is searching as long as it is snaking or circling (as set in the presets). If the weapon heads on a straight path, it is homing.

## SEAWOLF LAUNCH PANEL

The Launch Panel is composed of the Launcher Control Panel, the Tube and Weapon Selection Panel and the Presets Panel.

Tube Status Bar    Launcher Control Panel    Presets Panel



Tube and Weapon Selection Panel

## **Launcher Control Panel**

The Launcher Control Panel displays Launcher Controls for the two selected tubes. Above each Launcher Control is the Tube Status Bar containing the tube number, the name of the weapon loaded and the assigned target. The two tubes that display here are selected by clicking on a pair of tube numbers in the Tube and Weapon Selection Panel below.

## **Tube and Weapon Selection Panel**

Clicking on a tube number in the Tube and Weapon Selection Panel selects that tube number as well as the one above or below it and displays the Launcher Controls for the selected tubes in the Launch Panel. From the Tube and Weapon Selection Panel you can also change the weapon loaded in a specific tube. The name of the weapon currently loaded in the tube displays in green following each tube number.

## **Presets Panel**

Adjacent to each Launcher Panel is a Preset Panel containing the presets currently assigned to the weapon in the Launcher Control Panel. Presets entered from the Target Display are viewed here and can be adjusted if desired prior to weapon launch.

## **Basic Launch Procedure**

1. In the Target Display, assign a contact to a tube and set presets as appropriate.
2. In the Launch Panel, click the number of the desired tube in the Tube and Weapon Selection to select it. The tube's Launcher Controls display in the Launch Panel. Adjust presets in the preset panel to the right of the Launcher Control if desired.

✓ **Note:** Only rectangular buttons are selectable at various stages in the launch procedure. A green outline around a rectangular button indicates it can be selected at this stage of the launch sequence. Selected buttons flash until the indicated process is complete.

3. Click FLOOD. This button initiates the process that floods and equalizes the tube. When the tube is flooded the FLOOD button text is green. Reselecting this button at this point reverses the process.
4. Click MUZZLE DOOR to open the muzzle door. The button flashes until the door is open. The SYSTEM READY buttons turns green and the LAUNCH button is selectable.
5. Click LAUNCH to fire the weapon

To Wire Guide a torpedo return to the Target Display and select the torpedo symbol on the Fire Control map.

✓ **Note:** If the Launch button is not selectable make sure there is a target assigned to the tube. Also check the High-Pressure Air bank in Ship Control. A weapon launch requires a charge of at least 50% in

your air banks. If you have fired numerous weapons or performed an emergency main ballast tank blow, your air bank may be depleted and must be recharged. See *Seawolf Stations/Ship Control Station*.

## Reversing the Launch Process

If the launch procedure has started but the weapon has not yet been launched, the launch procedure must be reversed before the weapon in the tube can be changed. At this stage the MUZZLE DOOR outline and text is green. The LAUNCH button is outlined in green.

1. Click MUZZLE DOOR to start the reverse the process. The button flashes until both button and outline are orange.
2. FLOOD now appears with both green text and outline. Click FLOOD to reverse this step and drain the tube.
3. Once the FLOOD text is orange the tube can be reloaded.

✓ **Note:** When the weapon has been fired the reverse procedure happens automatically when you click MUZZLE DOOR. Be aware that closing the MUZZLE DOOR cuts the wire for any wire-guided weapon.

## Reloading/ Changing the Weapon in a Tube

The unload/load process takes 16 minutes. Loading an empty tube takes 8 minutes. If **Fire Control Quick Launch** option is selected in the **Options>Game** page, the Unload/load time is cut to 35 seconds and loading an empty tube is cut to 20 seconds.

1. In the Launch Panel's Tube and Weapon Selection Panel, click the name of the weapon in the tube you want to reload. (If the tube has been fired, click Empty.) Repeated clicks cycle through all the weapons available for loading in this tube.
2. Stop clicking when you see the name of the weapon or UUV you want to load.

❑ If you click an empty tube and the weapon names do not cycle, the muzzle door for that tube is still open. Click MUZZLE DOOR of the empty tube. This closes the muzzle door and automatically drains the tube in preparation for reload. If the tube has not been fired, the reverse steps must be done manually.

✓ **Note:** Closing the muzzle door cuts the wire on the torpedo or UUV launched from the tube. Wire guiding is no longer possible and you no longer receive sonar reports from the UUV once the wire is cut.

## The Unload/Load Process

If the tube's number is selected while it is being reloaded, you notice the WEAPON STOWED indicator blinks in the tube's Launcher Control Panel. The name of the weapon originally loaded in the tube displays in the Tube

Status Bar while the name of the weapon to be loaded appears in the Tube and Weapon Selection Panel.

Once the original weapon is unloaded the name of the weapon being loaded displays in the Tube Task Bar and the Target Assignment is cleared. (You must reassign a target to the new weapon from the Target Display.) The presets for the new weapon appear in the Presets Panel. The reload process is not complete until the Weapon Stowed indicator stops blinking.

**Tip:** Be very careful where you click in the Tube and Weapon Selection Panel. If you intend to select the tube number but click the weapon name instead, you start a reload of that tube. A reload is time consuming!

## ATTACKING LAND TARGETS

The Seawolf can carry Tomahawk Land Attack Missiles (TLAMs). To attack a land target from Fire Control, the latitude and longitude coordinates of the site must be fed into the fire control system and a series of waypoints defined for the missile to follow. The coordinates are usually defined in a tasking message.

1. Set Ownship depth to 150 ft or less and a speed of 6 knots or less. Do not fire the missile until this depth and speed have been achieved or the missile will fail on launch.
2. From the Target Display Station click the number of a tube containing a land attack missile. The DEFINE TARGET WAYPOINTS option appears in the Presets Panel.
3. Click DEFINE TARGET WAYPOINTS then click the Fire Control map to place four weapon waypoints. The number next to the last waypoint indicates the tube number.
  - ⇒ Click a waypoint to enter exact coordinates in the Latitude and Longitude presets or click and drag the waypoint to the desired location. Watch the latitude and longitude readout in the lower left corner of the Fire Control map as you drag the waypoint to determine its current location.
  - ❑ The outermost waypoint should be placed at the exact latitude and longitude of the target as specified in your orders.
  - ❑ If a landfall waypoint is directed in your tasking make sure that one of the earlier waypoints is placed at that latitude and longitude.
4. Set the destruct range for the missile. This is the range at which the missile will self-destruct if it has not encountered a target.
5. Initiate the launch procedure for the tube in the Launch Panel.

✓ **Note:** Land sites with Link Contact IDs can be targeted from the Nav screen using the Contact Menu's *Engage With* command.

## LAYING A MINEFIELD

Follow these steps to lay a minefield.

1. Check your tasking or determine the exact latitude and longitude for each mine to be placed.
2. Determine which tube will fire the mine destined for each specific location. From the Launch Panel, load the desired tubes with mines.
3. Set Waypoints for each mine to follow. In the Target Display Panel click the tube number to select. Click **DEFINE TARGET WAYPOINT** in the Preset Panel then click the Fire Control map to place the waypoint.
4. Select the waypoint and drag it to the desired location using the lat/long readout at the bottom of the Fire Control map or enter the desired latitude and longitude in the waypoint presets.

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**Tip:** Once mines are loaded and presets are entered, you can fire the tube from the Nav Map using the Ownship or Orders Menus. Map Markers can be placed on the Nav Map indicating the mine location and a launch point for the mine designated for that location. Using this method you can better tell when to fire the tube. *See Navigation Station/2D Map/Map Menu.*

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5. When all mines are ready to fire, launch the mines in the planned order from the Launch Panel or with the *Fire Tube* command in the Orders Menu.
6. After firing the mine, reload the tube with a new mine or weapon.

## DEPLOYING AND WIRE-GUIDING UUVs

Because a UUV is a sensor, not a weapon, it need not be assigned a target in the Target Display to be fired.

1. Set Ownship speed to 4 knots or less. Do not launch the UUV until that speed has been achieved.
2. In the Launch Panel click the number of a tube containing a UUV. The UUV presets appear in the Launch Panel Presets Panel.
3. To launch a UUV to a depth other than Ownship depth, click the checkmark to deselect USE OS DEPTH and display the DEPTH preset. Click or right-click a digit to increase or decrease the value.
4. Select the desired tube in the Launch Panel and initiate the launch procedure as for a torpedo.

If a UUV is in a tube it can be launched from the Orders or Ownship Menus using the FIRE TUBE command without visiting the Fire Control Station. It will be launched at Ownship's depth.

### Wire-Guiding and Enabling UUV Active Sonar

1. From the Target Display select the UUV symbol on the Fire Control map. The UUV has a U in the center of the symbol. The wire-guide controls appear in the Preset Panel

2. Click the ORDERED HEADING arrows to adjust the course of the UUV.
- Passive sonar mode is on by default when a UUV is launched but active sonar mode can be enabled at any time as long as the wire is still attached and the 30-minute battery is functioning. Be aware that capable ships and subs in the area can detect UUV active sonar. However, active sonar may be necessary when traversing a minefield. Follow these steps to enable UUV active sonar.
3. Click ENABLE to initiate active sonar.
4. Click PRE-ENABLE to de-activate active sonar and return to passive mode.
5. Click SHUTDOWN to stop sonar reports.

✓ **Note:** Closing the muzzle door after launching the UUV cuts the guidance wire. Once the wire is cut the UUV no longer sends sonar returns.

## UV Returns

Sonar returns from the UUV are automatically assigned a Track ID and can be found in the TMA Selected Track drop-down list and on the Nav and Fire Control maps. UUV sonar returns do not show up on any of the screens of the Sonar Suite although the UUV itself displays as a contact in Broadband and Narrowband Sonar. Depending on its course, the UUV may provide returns on Ownship.

- A contact detected by a UUV in passive mode appears on the Nav Map as a yellow *Unknown* symbol at the end of a white line of bearing that extends from the location of the UUV at a default range of 10 nm.
- A contact detected by a UUV in active mode appears as a yellow *Unknown* symbol at the end of a green line of bearing. The length of the LOB indicates the range of the contact from the UUV.

✓ **Note:** UUVs cannot be retrieved. Once the battery is expended you need only close the muzzle door to cut the wire and jettison the UUV. The tube can then be re-loaded. Altering Ownship's course by more than 90° cuts the wire.

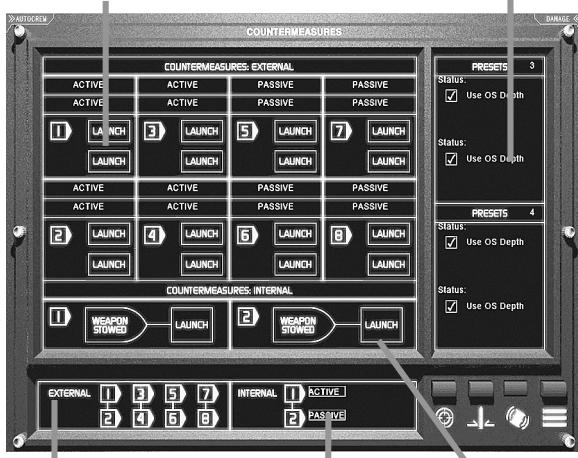
## SEAWOLF COUNTERMEASURE LAUNCH PANEL

Active and passive decoys are available in external and internal tubes. The loadout in the Seawolf's external countermeasure tubes can only be changed from Weapons Loadout Screen prior to starting a mission. Internal tubes can be loaded during gameplay as long as countermeasures are available.

The Seawolf's Countermeasure Launch Panel consists of The External Tubes Launch Controls, the Internal Tubes Launch Controls, the Presets

Panel, the External Tube Presets Selector, and the Internal Tube Preset and Countermeasure Selector.

External Tubes Launcher Controls



External Tubes Presets Selector

Internal Tubes Launcher Controls

Internal Tubes Presets and CM Selector

## External CM Tubes Launcher Controls

Each external tube can contain two countermeasures. In S.C.S. – *Dangerous Waters* you can launch each of these separately. The upper and lower Launch buttons correspond to the upper and lower countermeasures named above the Launch buttons.

### Launching a Countermeasure:

1. In the Internal or External Tubes Presets Selector click the number of the tube you want to fire. (The tube number above or below the selected tube is also selected.) The presets for the selected tubes appear in the Presets Panel.
2. *Use OS Depth* is selected by default. To enter an exact depth for the countermeasure, deselect *Use OS Depth* to display the *Depth* preset. Click or right-click the digits in the *Depth* preset to adjust the number values.
3. Find the desired tube number in the Countermeasure Launch Controls Panel and click LAUNCH. Launch buttons outlined in green can be fired. An orange outline indicates that the tube is empty.
4. If the tube fired was an internal tube, reload the tube.

## ***Reloading an Internal CM Tube***

Only the internal countermeasure tubes can be reloaded.

- ⇒ In the Internal Tubes Presets and Countermeasure Selector click EMPTY or the name of the countermeasure you want to change and continue to click to cycle through the available options.

## **SEAWOLF WEAPON INVENTORY**

The Weapons Inventory simply displays the current type and number of weapons on board your sub. No interaction is possible. The numbers decline as appropriate each time a weapon or countermeasure is dispensed.

## **SEAWOLF TACTICAL WEAPONS**

The Seawolf Class submarines carry weapons capable of targeting surface ships, submarines and land targets. For gameplay purposes the Seawolf can also target helicopters and low-lying planes from the sail bridge with a shoulder mounted SAM launcher when surfaced. Available weapons are described briefly below.

**Mk 48 Torpedo ADCAP (Advanced Capability):** This weapon can be used against both surface and submarine targets and can be wire-guided. It has a maximum range of 27 nm, a maximum speed of 55 knots and a maximum depth of 2,394 feet,

**TLAM (Tomahawk Land Attack Missile):** The Tomahawk is the standard sub-launched strike weapon for use against land targets. It has a range of approximately 1400 nm For successful launch of this weapon during gameplay, Ownship depth must not exceed 150 feet and speed must not exceed 6 knots.

### **Gameplay Weapons**

**TASM (Tomahawk Antiship Missile):** For gameplay purposes TASMs are assigned to the Seawolf and 688(I) class submarines. In actuality, these weapons have been removed from the fleet and are being converted to Tomahawk Land Attack Missiles. The TASM has a warhead of 500 kg and a range of 250 nm. For successful launch of this missile during gameplay, Ownship depth must not exceed 150 feet and speed must not exceed 6 knots.

**Harpoon: (Anti-Ship Missile):** Seawolf and 688(I) class subs no longer carry Harpoons. They are available for gameplay purposes in the loadout screen but they are not loaded by default. The Harpoon has a range of 70 nm. For successful launch of this missile during gameplay, Ownship depth must not exceed 150 feet and speed must not exceed 6 knots.

## SEAWOLF STRATEGIC WEAPONS

**Mk 67 SLMM:** The submarine-launched mobile mine is a modified Mk 37 torpedo whose warhead was replaced by a Mk 13 mine warhead. The torpedo's propulsion system is used to maneuver the mine to the coordinates programmed into its guidance system. The SLMM has a 235 kg warhead, a maximum speed of 26 knots and a maximum range of 11.5 nm

## SEAWOLF COUNTERMEASURES

Countermeasures are defensive weapons used to prevent an enemy's torpedo from destroying your sub. The Seawolf carries Active and Passive torpedo decoys that can be launched from Fire Control Launch Panel, or via the Ownship or Orders Menus' *Countermeasure* option.

**Passive Decoy:** Used against passive homing torpedoes, this decoy emits sound (noise) across a broad spectrum of frequencies in an attempt to deceive the torpedo into homing in on the decoy.

**Active Decoy:** Used against active homing torpedoes this decoy is a bubble generator that creates an area of bubbles in an attempt to provide a false echo to the torpedo.

**Decoy Depth:** Decoys fired from the Fire Control Launch Panel are launched at Ownship Depth. Countermeasures fired via the Ownship or Orders' Menus' *Countermeasures* option can be launched at either a Shallow (100 feet) or Deep (800 feet) depth.

## SEAWOLF PRESETS

Everything that can be launched from the Fire Control Station has at least one preset. Presets are instructions that tell the weapon or UUV or countermeasure what to do. All presets are presented here alphabetically by type.

⇒ Click/right-click on the digits to increase or decrease the value.

### Antiship Missile Presets

#### Harpoon and TASM

**Destruct Range:** Sets the range at which the missile self-destructs if a target is not encountered. Use this to avoid hitting neutral and friendly ships in the area.

**Seeker Activate:** Sets the range in nautical miles at which the missile begins to search. This can be used to help discriminate against other shipping in congested waters.

**Wide Seeker Pattern:** When checked the search pattern is set to wide. When deselected the search pattern is narrow. This can be used to help discriminate against other shipping in congested waters.

- ✓ **Note:** Your ship must be at 150 ft or less and at 6 knots or less to successfully launch one of these antiship weapons.

## Land Attack Missile Presets

### TLAM

**Define Target Waypoints:** Click DEFINE TARGET WAYPOINTS then click the Fire Control map to place four waypoints for the weapon to follow.

**Latitude/Longitude:** Click a waypoint to display presets for setting the precise Latitude and Longitude for the waypoint. Click or right-click the preset digits to increase or decrease the value. You can also click a waypoint and drag it to the desired location. Watch the Latitude/Longitude readout in the lower left of the Fire Control map when dragging a waypoint to determine the waypoint's current location.

**Destruct Range (nm):** Sets the range at which the missile self-destructs if a target is not encountered. Use this to avoid hitting neutral and friendly ships in the area.

- ✓ **Note:** Your ship must be at 150 ft or less and at 6 knots or less to successfully launch one of these Land Attack Missiles. Waypoints must be assigned before the missile can be launched.

## Mine Presets

### SLMM

**Define Target Waypoints:** Click DEFINE TARGET WAYPOINTS then click the Fire Control map to place a single waypoint.

**Latitude/Longitude:** Click the waypoint to display presets for setting the precise latitude and longitude for the waypoint. These coordinates define the final destination of the mine. Click the digits in the preset panel to set the desired value. You can also click a waypoint and drag it to the desired location. Watch the Latitude/Longitude readout in the lower left of the Fire Control map when dragging a waypoint to determine the waypoint's current location.

## Torpedo Presets

### Mk 48 ADCAP

**Snapshot Bearing (deg):** The weapon is fired on the bearing entered here. (This preset only appears if Snapshot is assigned to the tube from the Target drop-down list.)

**Search Pattern:** Set the search pattern for the weapon (Circle or Snake)

**Ceiling:** Set the depth above which the weapon does not travel.

**Floor:** Set the depth below which the weapon does not travel.

**Depth:** Set the depth at which the weapon travels.

**Speed:** Set the speed at which the weapon travels.

**RTE (yds):** (Run To Enable) Set the distance (in yards) the weapon travels before it enables and starts its active search. Enabling the weapon too soon can alert the target in time to take evasive measures. Enabling too late can mean the weapon runs past the target.

**Active:** When Checked the weapon is launched in Active sonar mode. Deselect to launch the weapon in Passive mode.

## **Countermeasure and UUV Presets**

**Use OS Depth:** Set the depth at which the UUV travels to that of Ownship. Use OD Depth is selected by default. Deselect the option to display the Depth option.

**Depth:** Enter the desired depth for the UUV to travel. Click a digit to increment the value. Right-click to decrease the value.

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## **SEAWOLF TMA STATION [F7]**

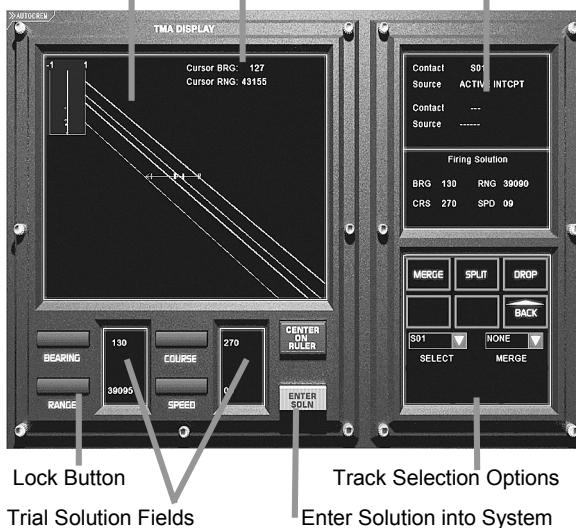
At the Target Motion Analysis (TMA) station, data from the Seawolf's sensors are used to determine a contact's bearing, range, course and speed. This information, called a target solution or simply a solution, is necessary to accurately target a contact with your ship's weapons.

Performing TMA is not easy and without at least a rudimentary understanding of TMA functionality it is highly unlikely that TMA can be performed successfully. Since the FFG and all submarine classes in S.C.S. - *Dangerous Waters* have a TMA station, the TMA basics are described just once in this manual. See *Training/TMA Basics* for information on how to perform target motion analysis. Refer back to that section while learning to perform target motion analysis at the Seawolf's TMA station.

## **SEAWOLF TMA STATION COMPONENTS**

The Seawolf's TMA station is composed of several distinct areas: The TMA Display, the view controls and readouts, the track selection area, trial solution input area and the solution area. These areas are described briefly below. See the Training Section on TMA for additional information about these areas.

TMA Display      Cursor Readouts      TMA Data Display



## Seawolf TMA Display

The TMA Display, sometimes called the TMA Board, presents a representation of Ownship, a history of bearing data for a selected contact, a TMA ruler and an error dot stack. These tools are used to analyze sensor inputs.

### Bearing Lines (LOBs)

When a sensor sends a bearing report to the TMA a history of each report is maintained. When a contact is selected the bearing report history for that contact appears on the TMA board. The lines extend indefinitely for contacts reported by sensors that report only a bearing. The ruler is found at the default range of 10,000 yards.

The ruler is found at the end of the LOB (the reported range) when it is reported by active sonar, radar or the stadiometer. The color of the bearing lines indicates the sensor that is detecting it.

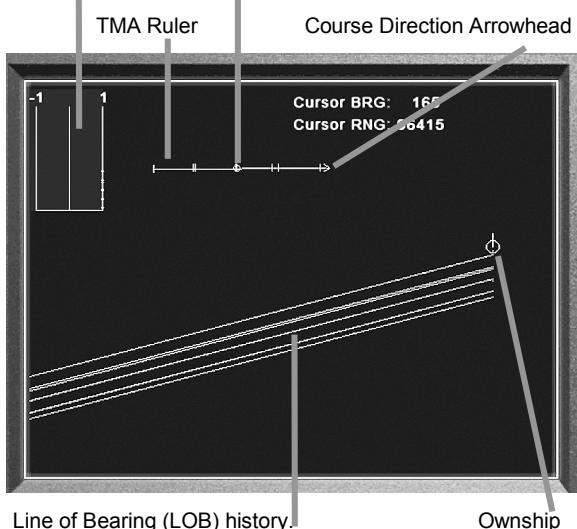
<b>Spherical (bow) array:</b>	White
<b>Conformal (hull) array:</b>	Blue
<b>Towed Array:</b>	Purple
<b>Active sonar:</b>	Green
<b>Active Intercept:</b>	Yellow
<b>Periscope or ESM:</b>	Red
<b>Radar:</b>	Yellow

UVU passive sonar:	White
UVU active sonar:	Green

## Time History Right-Click Menu

Right-click the TMA Display to change the bearing return history on the TMA Display. As long as a tracker is tracking, bearing information is sent to TMA in two-minute intervals. If the screen gets too cluttered, change the number of lines that are displayed. History options available are 10 minutes, 20 minutes (default), 1 hour and 4 hours. A check mark indicates the selected option.

TMA Dot Stack    Ruler Handle



## The TMA Ruler

The TMA ruler is used to generate your best estimate of the contact's course and speed. Its location on the board relative to Ownship indicates your estimate of the range of the contact. With each new bearing line an additional tick mark is added to the ruler and another dot is added to the top of the dot stack.

The ruler components are described below.

- The arrowhead on the ruler indicates the *course* of the contact.
- The length of the ruler represents the current estimate of the contact's *speed*: the longer the ruler, the faster the estimated speed.
- The distance of the ruler from the Ownship marker represents the contact's estimated *range*.
- Each tick mark represents a specific interval of time. (Towed and Bow arrays update every two minutes while radar and continuous active

sonar update with every sweep or ping.) The mark at the end of the ruler represents the initial or oldest information.

- The *estimated current bearing* of the contact is a point just ahead of the arrowhead. The *last reported bearing* is represented by the tick mark closest to the arrowhead.

✓ **Note:** All of the current estimates represented by the ruler appear in numerical form in the Solution Input Area under the TMA Display.

### Manipulating the Speed Strip Ruler

The speed strip ruler is adjusted as follows.

**Adjusting length and direction:** Click and drag the end mark or the arrowhead to adjust the length or direction of the ruler.

**Positioning Tick marks:** The tick mark closest to the arrowhead should be placed on the most recent bearing line. The end tick mark should be positioned on the initial or oldest bearing line.

**Using the Handle:** A circle appears at the center of the ruler when more than one tick is present and speed is more than zero. The circle acts as a handle. Click the handle and drag the entire ruler to another location. The handle maintains the current course and speed settings of the ruler and adjusts range and bearing.

**Tip:** Center on the ruler and zoom in to better manipulate the ruler and access the handle. If you have difficulty dragging the ruler to get the arrowhead pointed in the desired direction, enter the desired course number in the course field. You can also press [SHIFT] and click and drag the TMA Display where you want to place the end of the ruler or press [SHIFT] and right-click and drag to place the arrowhead.

### The Dot Stack

The dot stack in the upper left corner is a graphical representation of the error between tick marks and bearing lines. The dot at the top of the stack is associated with the most recent bearing line. Moving the ruler and adjusting the location of the tick marks allows you to line up the dots along the center vertical line in the dot stack. The analysis is probably most nearly correct when the top most dots are on the centerline. This process is called stacking the dots.

### Seawolf TMA Data Display

The upper right corner of the TMA station contains the TMA Data Display. The named fields in the Data Display are described briefly here.

**Contact:** The upper Contact field displays the contact ID that is selected in the SELECT drop-down list and the second instance displays the contact ID that is selected in the MERGE drop-down list. See *Select Tracks* below.

**Source:** The upper Source field displays the sensor source (e.g. Sphere or Towed) of the contact selected in the SELECT drop-down list and the

second instance of the word displays the sensor source of the contact selected in the MERGE drop-down list. See *TMA Button Matrix>Select Tracks* below.

**Firing Solution:** Also called the system solution, the values seen here represent the current solution in use by the Fire Control system for the selected contact. These fields display zeros until you have clicked ENTER SOLN in the TMA Trial Solution Area.

- ⇒ To change the solution in use by the system for the selected contact, alter the ruler to the desired position on the TMA Display or enter numbers directly into the trial solution area fields, then click the ENTER SOLN button again.

### **Seawolf TMA Button Matrix**

In the lower left of the TMA station is the main TMA button Matrix. Buttons with downward pointing arrows display additional controls.

**SELECT TRACKS:** Click to display the contact selection matrix and the following options:

**MERGE:** Merges the contacts selected in the Select and Merge drop-down lists.

**SPLIT:** Splits the merged contact (M01, M02 etc) selected in the SELECT drop-down list into its two original components.

**DROP:** Permanently drops the contact selected in the SELECT drop-down list.

**SELECT Drop-down list:** Displays the Contact IDs of all contacts marked by OS sensors. When a contact is selected here its bearing history is displayed on the TMA board.

**MERGE Drop-down list:** Displays all Contact IDs except that of the contact selected in the SELECT drop-down list. When a contact is selected here, its bearing history appears on the TMA board along with that of the contact selected in the SELECT drop-down list.

**BACK:** Returns to the main button matrix.

**TIME:** Click to display the numbered buttons that control the minutes of bearing history to be displayed on the TMA Board. As long as a tracker is tracking, bearings are plotted every 2 minutes, therefore 10 min = up to 5 bearing lines, 20 min = up to 10 bearing lines, etc. Options are 10, 20, 60 and 240 minutes.

**TMA Display View Controls:** The buttons in the lower three-quarters of the main TMA button Matrix contain controls for adjusting the view on the TMA Display board.

**CENTER ON OWNSHIP:** Click to center the OS symbol in the TMA Display.

**Arrows:** Click to move the view in the direction of the arrow.

**ZOOM IN/ZOOM OUT:** Click to zoom the view as indicated or use these keyboard/mouse

- ⇒ Press [CTRL] and click to zoom out. Press [CTRL] and right-click to zoom in.
- ⇒ Roll the mouse wheel forward to zoom in, backward to zoom out.
- ⇒ Click the CENTER ON RULER button below the TMA Display before zooming in for the clearest view.

### **Seawolf TMA Trial Solution Area**

The area below the TMA Display is used to create and fine-tune a firing solution for the selected contact. From this area the solution is entered into the ship's fire control system.

**BEARING, COURSE, RANGE, and SPEED Fields:** Represent the trial solution for the selected contact. The current position and size of the TMA ruler is reflected in these fields. These numbers are altered by dragging and resizing the ruler or by entering values directly into these fields. The ruler moves to reflect the entered values.

**Lock Buttons:** Click the button to the above of each field to lock the value in that field. The ruler reflects the locked value. A depressed, illuminated button indicates a locked value. (If a value is locked for one contact it is locked for all. Unlock the field when analyzing other contacts.)

**CENTER ON RULER:** Click to bring the ruler to the center of the TMA Board.

**ENTER SOLN:** Click to enter the values in the trial solution fields into the fire control system. The NTDS symbol for this contact is located on the Nav and Fire Control maps at the designated bearing and range and moves on the course and speed entered here.

- ✓ **Note:** The ruler position for selected contact A is not retained when you select Contact B unless a solution has been entered for Contact A prior to selecting another contact. This means that unless you enter your solution, the ruler you have carefully positioned on contact A will be in a different position when Contact A is reselected. Don't lose your work. Enter your solution. You can always fine-tune it later.

### **TMA ON RADAR, ACTIVE SONAR, VISUAL CONTACTS**

Contacts marked with active sonar, radar and the Stadiometer appear as a bearing/range pair on the TMA Display. The bearing line ends with a tiny triangle positioned at the range of the contact. If the target's bearing and range are known at two different times, as is the case with active sonar and radar, the solution can be found by connecting dots and 'drawing a line' with the ruler for course and speed.

A UUV in active mode provides returns from the location of the UUV in TMA and on the Nav and Fire Control maps.

- ✓ **Note:** Marking a contact with the periscope does not provide an automatic range. But using the Stadimeter to manipulate a photo of the visual contact can provide you with a range that is fairly accurate. See *Seawolf Stations/Seawolf Periscope-Stadimeter Stations/Seawolf Stadimeter Station*. When visual or periscope contacts are referred to in this section, it is assumed that you have determined a range for the contact and marked it in the Stadimeter Station. The Periscope and Stadimeter Stations work hand in glove.

### To determine a target solution for Active Sonar, Periscope or Radar Contacts:

1. Click SELECT TRACKS. From the SELECT dropdown list select a contact ID.
- Radar contacts have an R designation, visual contacts have a V designation, and active sonar contacts have an S designation the same as passive sonar contacts.
- A bearing line appears on the TMA Display. A tiny triangle at the end of the bearing line indicates the target's range at time the contact was marked.
2. After a short interval return to the active sonar or radar station (whichever you are using) and mark the contact again. (When ON Radar Autocrew automatically marks contacts as long as the Radar is radiating.)
  - ⇒ For visual contacts, take another photo of the contact from the periscope and manipulate it in Stadimeter, then mark the contact again from the Stadimeter Station.
  - ⇒ Continue to mark the contact at two-minute intervals to accumulate several bearing lines. Toggle back and forth between the TMA and your chosen sensor.
3. Adjust the view on the TMA Display to get a clear view of the ruler and the range triangle.
  - ⇒ Move the ruler to the location of the range triangle, click CENTER ON RULER then click the zoom buttons to better adjust the view. If you lose site of the ruler, zoom all the way out or click the red center on ruler button again.
4. Drag the arrowhead or tail of the ruler to adjust the tick marks along the bearing lines until the dots line up in the dot stack indicating a good solution.
5. Click ENTER SOLN to send the trial solution to the Fire Control system.

## TMA ON PASSIVE SONAR AND ESM CONTACTS

Determining a plausible solution is more complex when only a bearing is known, as is the case with passive sonar and ESM contacts. It takes more time and changes to Ownship course may be necessary to determine an accurate solution.

Passive sonar contacts with assigned trackers are updated automatically on the TMA Display. ESM contacts must be updated manually by repeatedly marking the contact at the ESM Station. Contacts detected by a UUV in passive sonar mode are displayed on a LOB from the location of the UUV on the TMA Display and in the Nav and Fire Control maps.

### To perform TMA on passive sonar contacts:

1. Click SELECT TRACKS. From the SELECT dropdown list select a contact ID.
- A line of bearing appears on the TMA Display. The ruler appears at the default range of 10,000 yards on the most recent LOB with the arrowhead facing Ownship (or the UUV sensor if it is a UUV contact) with a default speed of 10 knots. These default values appear in the trial solution fields directly to the right of the TMA Display.

✓ **Note:** No contacts appear in the drop-down lists if no contacts have been designated. Link contacts do not appear in the TMA track list.

2. Adjust the ruler position to estimate the contact solution.
  - ⇒ Position the end tick of the ruler on the oldest bearing line. (The end tick is on the oldest bearing line when the bottom dot is on the centerline of the dot stack.)
  - ⇒ Click CENTER ON RULER then click the zoom buttons to better adjust the view.
  - ⇒ If you lose site of the ruler, zoom all the way out or click CENTER ON RULER again.

✓ **Note:** The circular ruler handle is only visible when the ruler contains more than one tick mark or a speed of greater than 1 knot (kt) is set in the Speed field in the trial solution area. You must zoom way in on the ruler to see it at that speed. You also can set the speed temporarily to 10 knots or more. This will expand the ruler and reveal the handle.

3. Enter any known data in the trial solution fields.
- If you have additional data on the contact's range, or course, for example from an intelligence message, enter it in the appropriate solution field. If you have determined the contact's speed using DEMON, enter that speed in the speed field. See Seawolf Stations/Seawolf Sonar Suite/Seawolf DEMON Sonar Station. Click the digits to cycle through the values.

- If you are sure about one aspect of the solution (e.g. range) enter that value directly into the Range field then lock the field. That keeps you from dragging the ruler to a different range.
  - ⇒ To lock a field, click the red button associated with the field. Lock buttons are located to the right of each trial solution label. These buttons are lit when the field is locked.
- 4. Adjust the ruler on the display until the tick marks align well with the contact bearing lines and the dots appear to line up along the centerline off the dot stack.
  - ⇒ Click the handle in the middle of the ruler to drag the entire ruler.
  - ⇒ Click and drag on either end of the ruler to move just that end or to adjust the length of the ruler.
- 5. When a good match between the tick marks, the bearing lines and the dot stack has been achieved, click ENTER SOLN to send this information to the Fire Control system. The system tracks the estimated position of the contact based on this system solution and uses that estimated location when targeting the contact.
- The entered system solution displays in the Firing Solution fields in the TMA Data Display. To update the contact's system solution, adjust the ruler or directly input information in the trial solution fields and click ENTER SOLN again.
- 6. Changing Ownship's course and/or speed can refine the TMA solution. After steadyng on the new course and/or speed, adjust the ruler to achieve the best fit.
- If one TMA solution does not fit the entire observed bearing data, consider the fact that the contact itself may have changed course and/or speed (a contact "zig"). Attempt to achieve a better fit of the ruler by disregarding some of the earlier bearing lines and looking only at recent bearings.

## **Merging, Splitting and Dropping Contacts**

If the same contact is tracked by more than one sensor (e.g., a contact tracked by passive sonar and radar), the data can be merged into a "master" contact. (Master contacts have alphanumeric designations that begin with the letter M.) This can be very useful if you have a good range from one sensor (radar or active sonar) and a good bearing history from another (passive sonar).

1. Click SELECT TRACKS. From the SELECT drop-down list select one of the contacts to be merged.
2. From the MERGE drop-down list select the track to be merged with the contact selected in the SELECT drop-down list.
3. Click the MERGE button.
  - ⇒ To undo a merge, select the master contact (e.g. M01) from the SELECT drop-down and click the SPLIT button.

- ⇒ To drop the selected contact altogether, click the DROP button. Dropping a contact cannot be undone.

- ✓ **Note:** If the TMA Autocrew is activated you cannot move the TMA ruler. *Seawolf Autocrew/Seawolf TMA Autocrew*

## TMA ON UUV SENSOR CONTACTS

In S.C.S. - *Dangerous Waters* all controllable submarines can carry Unmanned Underwater Vehicles (UUVs). These UUVs have sonar capabilities only and cannot launch weapons. For information on launching UUVs see *Seawolf Stations/Seawolf Fire Control Suite/Deploying and Wire-Guiding UUVs*.

The lines of bearing for contacts detected by a UUV are drawn from the location of the UUV at the time of the report, not from Ownship's location. TMA on UUV contacts is performed as for any other sonar contact in active or passive mode.

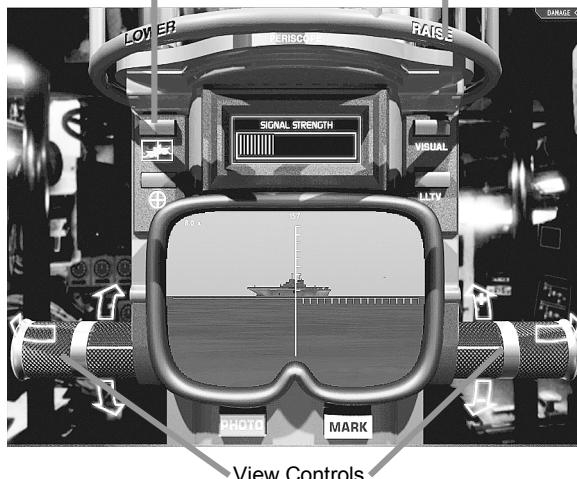
## SEAWOLF PERISCOPE-STADIMETER STATIONS

### [F8]

The Seawolf Periscope Station in S.C.S. - *Dangerous Waters* merges the functionality of the Periscope with that of the Stadimeter. The Stadimeter is only accessible from the Periscope Station. It is explained later in this section.

- ⇒ Click the Stadimeter icon button to the left of the SIGNAL STRENGTH indicator to enter the Stadimeter Station.

To Stadimeter      Click to Raise Periscope Mast

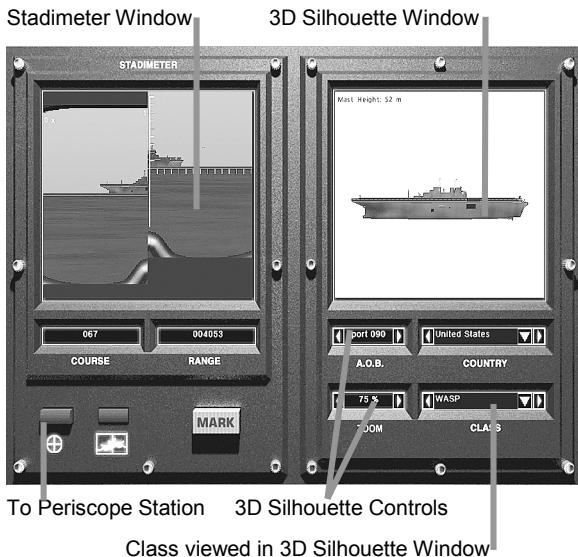


## DETECTING CONTACTS WITH THE PERISCOPE

1. Ensure the ship is at periscope depth (61 feet) and at a speed of 10 knots or less if the sail is submerged. (Sea state affects periscope depth. If the seas are rough you may have to go shallower.)
2. Click RAISE to raise the periscope mast.
3. Rotate the periscope to look for contacts. Click the green arrows on the left and periscope handles, or click and drag in the periscope view to rotate the periscope 360°.
4. Make use of the periscope's ESM sensor as you rotate the scope. This sensor can alert you to the presence of a contact before you can see it in the periscope view. The ESM indicator lights illuminate from left to right when a radar emitter is detected. (Green indicates a weak signal, red a strong one.)
5. Zoom and adjust the view. Center the view on the contact of interest. Zoom in and adjust the elevation as needed.
  - ⇒ Click the green + arrows on the right-side periscope grip to zoom in. Click the green - arrow on the grip to zoom out.
  - ⇒ Click the upper half of the Elevation crank to lower the elevation. Click the lower half to raise it.
6. With a contact centered in the periscope reticule click MARK to assign it an alphanumeric designation and send the bearing information for the visual sighting to the Target Motion Analysis station and the Nav Map. Visual contacts have a V designation. (V01, V02 etc.). When marked by the periscope the contact symbol appears on a line of bearing at a default distance.
7. Center the contact in the middle of the periscope view. Align the horizontal line with the waterline before you take the picture. Click PHOTO to send a photo of the contact to the Stadimeter.

## SEAWOLF STADIMETER STATION

The Stadimeter Station is accessible only from the Periscope station by clicking the Stadimeter icon button. The Stadimeter is used to manipulate a photo of a contact taken through the periscope to determine the contact's **range**. The Stadimeter can also be used to compare the photo to the ship's database of ship silhouettes to **determine its class** and **course**.



## Determining Course with Stadimeter

1. Take a photo of a contact in the Periscope Station [F9].
2. Click the Stadimeter icon button to switch to the Stadimeter Station.
- When the Stadimeter Station appears, the last photo taken through the periscope appears in the STADIMETER window.
3. In the CLASS field the ship's computer provides the names of ship classes similar in length to the photographed ship. Click the left and right facing arrows on either side of the Country and Class windows to cycle through the filtered names. A 3D ship silhouette of the selected class displays in the 3D silhouette for each available class in the 3D SILHOUETTE WINDOW.
4. Click the ZOOM arrows to match the size of the 3D silhouette with that of the photographed contact.
5. Rotate the silhouette by clicking the right and left facing arrow buttons on either side of the AOB window until the aspect of the 3D model matches that of the ship in the photo. Viewing the 3D object from a similar angle to the ship in the photo helps you identify the correct class. When the aspect matches the photo, a close approximation of the contact's course appears in the COURSE window. Course is a piece of information needed in developing a firing solution in TMA.

## Determining Class/Range with the Stadiometer

1. Click the right and left facing arrows on either side of the COUNTRY and CLASS windows and compare each 3D Silhouette to the ship in the photo.
2. Rotate the silhouette model by clicking the AOB arrows. Click the Zoom buttons to alter the size of the silhouette in the window. When a ship class is matched to the photo, leave the selected class name in the CLASS field.
3. Click the side of the photo containing the contact's highest mast and drag that side of the photo such that the top of the highest mast is even with the waterline on the other half of the photo. The estimated range to the ship is displayed in the Range readout.
4. Click MARK. This sends the contact's bearing and range to TMA and the Nav Map and assigns the class name showing in the CLASS window to the contact. You must still assign an ID (Friendly, Hostile, Neutral etc) to the contact using the contacts right-click Contact Menu on the Nav Map.

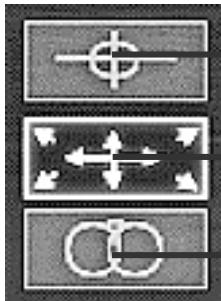
✓ **Note:** The photo must be manipulated to determine a range when the contact is marked or no contact is created on the Nav Map or TMA.

5. Click the Periscope icon button to return to the Periscope Station view.

## SEAWOLF SAIL BRIDGE (SAM LAUNCHER) [F9]

The Sail Bridge station is only accessible when the submarine is surfaced. The Sail Bridge provides three views: Free Look, Shoulder Mounted SAM Launcher and Binoculars.

→ Click the desired icon button to switch to that mode.



SAM Launcher

Free Look

Binoculars

**Free Look:** The default view in the Sail Bridge provides a 360° naked-eye view of the area. Click and drag to pan the view.

**Binoculars:** Zoom from 2X to 16X by clicking the right side of the thumb wheel at the top of the screen. Click the left side to decrease zoom. Click

and drag to pan the view. VISUAL mode is selected by default. LLTV mode is available for night vision.

**SAM Launcher:** The Seawolf in S.C.S. - *Dangerous Waters* carries FIM-92 Stinger Surface to Air Missiles. A shoulder mounted SAM launcher is modeled and can be used to attack helicopters and low flying airplanes. The SAM launcher view provides a first-person shooter aspect to engage aircraft within range:

FIM-92 Stinger: Range: 4.3 nm (8,000 meters)

## LAUNCHING SURFACE TO AIR MISSILES

1. Surface the ship.
2. Press [F9] to access the Sail Bridge. This button is not enabled until the ship is on the surface or the sail is mostly exposed.
3. Click the SAM Launcher icon button.
4. Click and drag in the view to position the reticule on the target.
5. The interior Target Indicator bars turns red when there is a valid target centered in the reticule. Right-click to fire the weapon. It automatically reloads

✓ **Note:** If you submerge the ship or heavy seas submerge the sail for long periods of time, the view moves to the Nav Map. The Sail Bridge is not accessible until the ship resurfaces.

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## SEAWOLF AUTOCREW

This section describes the Autocrew features available on the Seawolf class submarine during gameplay. In some cases when an Autocrew feature is ON you are prevented from making any input to the station. Check the descriptions below to determine what if any input is needed from you when the Autocrew is ON at a given station. Stations that have an Autocrew have an Autocrew slider button in the upper left corner of the station interface.

- ⇒ Click the Autocrew slider button to toggle the state of that Autocrew. The Autocrew is ON when the crew silhouette is showing.

## SEAWOLF BROADBAND/NARROWBAND AUTOCREW

When ON, the Broadband-Narrowband Sonar Autocrew marks contacts in Broadband and searches Narrowband for contacts. Because they share trackers, contacts marked in Narrowband also display in Broadband. Autocrew also assigns trackers, classifies all marked contacts in Narrowband and assigns a Low, Medium, or High level of confidence in his classification. The level of confidence displays in the Navigation Station's DDI and above the 3D model when that contact is selected.

**Low level of Confidence:** Crewman has narrowed the possible classes to 4 or more and picks one at random

**Medium Level of Confidence:** Crewman has narrowed the possible classes to 2 or 3 and picks one at random

**High Level of Confidence:** Crewman has narrowed the possible classes to one

When this Autocrew is ON you can still mark contacts yourself and select different arrays and contacts for the crewman to analyze.

- ❑ **On the Nav Map:** Each contact marked by your Sonar Autocrew appears on the Nav Map as a colored line of bearing ending with a symbol. This is usually the symbol for Unknown/Unknown (Unknown platform category/Unknown alliance ID) and is accompanied by its Contact ID number (S01, S02, etc). As soon as your Sonar Autocrew has classified the contact, the symbol changes to that of the specified category. See *Navigation Station/2D Navigation Map/NTDS Symbols*. Clicking on the Contact ID displays information about the class in the DDI and the 3D model of that class appears in the 3D view surrounded by a bounding yellow bounding box and a level of confidence bar.
- ❑ **Your task:** Your Sonar Autocrew can classify a contact as a specific class, but he cannot determine its alliance (ID). You must do that yourself on the Nav Map.
  - ⇒ On the Nav Map, right-click the contact's symbol to display the Contact Menu.
  - ⇒ Select *Designate Category//ID>/ID* and drag your cursor to select the presumed alliance ID for the contact.

## SEAWOLF SONAR ACTIVE INTERCEPT AUTOCREW

When ON, the Active Intercept Autocrew marks contacts. You are not prevented from marking contacts but the Autocrew is likely to mark them faster than you can.

## SEAWOLF RADAR AUTOCREW

You must raise and lower the radar mast. When ON, your Radar Autocrew performs the following task as long as the radar is on.

- ❑ Marks contacts and re-marks them every minute that the contact can be detected. Contact range and bearing is sent to TMA and is reported on the Nav screen DDI when that contact is selected.
- ✓ **Note:** The Radar Autocrew is not speedy. It takes a minute or two before he begins to mark contacts. When Radar Autocrew is ON, you cannot move the Radar cursor.

## SEAWOLF FIRE CONTROL AUTOCREW

When ON, the Fire Control Autocrew performs the following duties:

- Uses information sent from the TMA station to establish presets for the selected weapon that are appropriate for the assigned target.
- Your Task:** It is still your responsibility to select a target, assign a tube, and fire the weapon from the Fire Control Launch Panel or by using the Contact Menu's *Engage With* command from the Nav. Your Fire Control Autocrew uses the contact's classification when determining presets. If you classify a contact as a surface ship when in actuality it is a submarine, your Autocrew enters presets appropriate for a surface ship.

✓ **Note:** When the Fire Control Autocrew is ON you can set only Snapshot bearings and place waypoints in the presets. All other presets are greyed out.

## SEAWOLF TMA AUTOCREW

Accurate TMA takes time. Your TMA Auto Crewman requires data from several sensors and/or a change in Ownship's course to generate an accurate firing solution. When ON, the TMA Autocrew performs the duties mentioned below.

- ⇒ Click the AUTOCREW slider button in the upper left corner of the TMA station to toggle the state of the TMA Autocrew. Autocrew is ON when the silhouette is visible.
- Uses information reported from all sensors to determine a firing solution. This solution is his best estimate of the course, bearing, range and speed of a contact.
- Merges contacts that represent the same track reported by different sensors.
- Keeps track of the movement of each contact and updates the solution on the Nav and Fire Control Maps with every new sensor input. The solution is updated immediately with his best guess whenever a contact is selected from the drop-down list in the TMA station.
- Once the crewman enters a solution for a contact, the contact then appears as a symbol on the Nav Map at the designated range and bearing and the solution is also sent to Fire Control for use in targeting. A yellow symbol for *Unknown* is displayed until you or the Sonar Auto Crewman categorizes it.
- The Nav Map symbol for the contact moves on the map according to the course and speed set in the solution.

✓ **Note:** When TMA Autocrew is on, you can select specific contacts to view on the TMA board, but you are not able to manipulate the ruler or the settings.



## *SECTION 13*

# *688(I) STATIONS*



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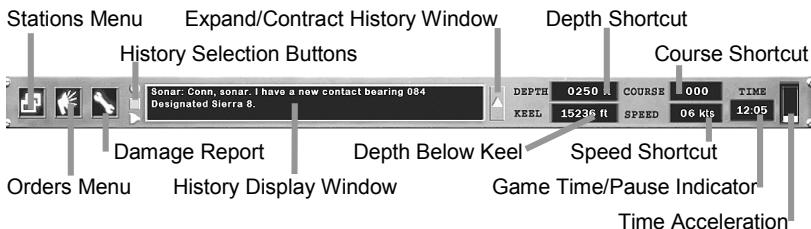
## 13: 688(I) STATIONS

The station functionality of the Improved Los Angeles Class submarines is covered in this section. The Improved Los Angeles class is referred to as 688(I) in this S.C.S. - *Dangerous Waters* manual.

- ✓ **Note:** The default view when entering a mission is the Navigation Station. The Navigation Station with its 2D Nav Map and 3D view functions the same on every controllable platform and is covered only once in the manual. See *Navigation Station*. Some Nav Station information unique to the 688(I) is contained in the abbreviated *688(I) Navigation Station* section later in this section.

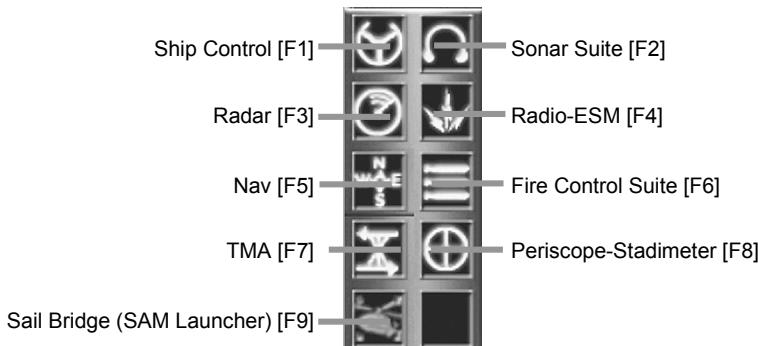
### 688(I) TASK BAR

The Task Bar for all submarines functions the same. Differences are cosmetic. The 688(I)'s Task Bar appears below.



### 688(I) STATIONS MENU

Click the Stations Menu button to expand the selection menu. Select an icon to jump to that station or use the appropriate function key. Selected menu items are orange.



## 688(I) ORDERS MENU

**Navigate:** Displays a submenu of navigation shortcuts

**Left Full Rudder:** Sets OS on a hard turn to port.

**Right Full Rudder:** Sets OS on a hard turn to starboard

**Rudder Amidships:** Sets the rudder back in the zero position. If you do not set the rudder back to zero the ship eventually turns in a circle. Setting a specific course automatically resets the rudder once the course change is completed.

**Set Depth:** Displays a submenu of shortcuts to specific depths.

**Surface:** Orders a normal surface of the ship. (Emergency surface is only available from the Ship Control Station.)

**Go to PD:** Orders the ship to Periscope Depth (63 feet).

Depending on sea state you may need to order a shallower depth to clear the scope.)

**Go Shallow:** Orders a depth of 147 ft.

**Go Deep:** Orders a depth of 1,254 ft.

**Go to Snorkel Depth:** Orders a depth of 56 ft.

**Change Speed:** Displays a submenu of engine order shortcuts. Given no strong currents in the area, selecting one of the following commands results in the indicated speed:

**All Ahead Flank:** Maximum speed for platform (35 knots)

**All Ahead Full:** 20 knots

**Ahead Standard:** 15 knots

**Ahead 2/3:** 10 knots

**Ahead 1/3:** 5 knots.

**All Stop:** Orders OS to a full stop.

**Back 1/3:** 4 knots in reverse

**Back 2/3:** 8 knots in reverse

**All Back Full:** 12 knots in reverse

**All Back Emergency:** 16 knots in reverse

**Arrays/Wires:** Displays a submenu permitting you stream, retrieve or stop the winch deploying the Port and Starboard Towed Arrays and the Floating Wire.

**Masts and Antennas:** Raise masts individually or lower all at once. Raising the masts while submerged can damage them if OS speed exceeds 8-10 knots. See *Appendix C: Submarine Max & Mins* for information on safe speeds for extending each mast while submerged. The Snorkel Mast option

is only available when at snorkel depth (56 feet) or shallower. Raising the mast initiates ventilation. The process is secured from this menu or from the Ship Control Station via the VENTILATE button, automatically lowering the mast.

**Autocrew:** Displays a submenu of Autocrew options. Selecting an option toggles its state. A checkmark indicates that the Autocrew is ON. See 688(I) *Stations/688(I) Autocrew* for a full description of Autocrew functionality.

**Fire Tube:** This menu option only appears when there is a weapon loaded and ready to shoot. Weapons are loaded in the Fire Control Launch Panel and presets determined in the Fire Control Target Display.

**Countermeasures:** Launch either active or passive decoys. From the Orders Menu a depth of shallow (100 feet) or deep (800 feet) can be selected.

## DAMAGE REPORT WINDOW

The damage report window lists damage to any station. The text scrolls as necessary. When a station has damage, the damage indicator in the upper right of a station slides out to reveal a wrench. When the wrench is present on a screen, check the Damage Report Window for more specific information on the time required to repair the damage or notification that the damage cannot be repaired. Be aware that parts or all of a station will not work when damage has occurred.

⇒ Click the wrench button in the Task Bar to open/close the window.

## HISTORY WINDOW

Displays the type of history selected by buttons to the left of the window. The newest report appears at the bottom of the scrolling list.

**History Selection Buttons:** A lit button indicates the currently selected History type. If there is a new message in any other window, that window's selection button flashes until that button is selected.



- Crew Report History: Lists all orders as acknowledged by crewmembers
- Radio Traffic History: Lists all radio messages received.
- Multiplayer Chat History: Displays a history of multiplayer chat messages.

## MANEUVER SHORTCUTS AND GAME READOUTS

**DEPTH:** Keel depth reported in feet. Click/right-click digits to order a depth change.

**KEEL:** Readout of the depth of water below the keel in feet.

**SPEED:** In knots. Click/right-click digits to order a speed change. You cannot enter a speed that exceeds maximum speed for the class.

**COURSE:** Current course in degrees. Click/right-click digits to enter a new course.

- ✓ **Note:** Currents affect Ownship course and speed. It may not be possible to achieve the exact ordered course or speed if the currents are strong. Currents can be turned OFF/ON in the *Options>Game* page prior to mission start.

**TIME:** Displays the time of day in the mission based on a 24-hour clock. When the game is paused, the time display is replaced by the word PAUSED.

- ⇒ Press [P] to pause the game. Press [P] again to resume the game.
- ⇒ Click the numbers in the Time display to pause the game. Click PAUSED in the time display to restart the game.

## TIME COMPRESSION SCALE

In addition to real time, S.C.S. - *Dangerous Waters* supports four levels of time compression. The time scale displays in the far right of the Task Bar. A stack of colored bars represents the level of time compression.

- ❑ At real time, a single green bar is displayed.
- ❑ At twice real time a lime (yellow/green) bar appears above the green bar.
- ❑ At four times real time a yellow bar is added to the stack.
- ❑ At eight times real time an orange bar is added.
- ❑ At up to sixteen times real time (depending on system capability) a red bar appears at the top of the stack.
- ⇒ Press [.] or [,] or click/right-click on the scale to toggle through all the time scales

- ✓ **NOTE:** Time compression is not available in Multiplayer missions.

## 688(I) SHIP CONTROL STATION [F1]

688(I)'s Ship Control Station features are described below:

**TRIM ANGLE:** Indicates the trim angle of the ship measured from a horizontal axis. A positive trim angle indicates the ship has a bow-up attitude. A negative trim angle indicates a bow-down attitude. The helmsman automatically controls the trim angle whenever a depth change is ordered.

**HP AIR:** This panel is used to monitor the current charge level in the high-pressure air banks and to charge the banks when they are depleted. A charge of 50% is necessary for successful weapon launches. The charge can be increased by only 10% when the ship is submerged. You must come to snorkel depth (56 feet) or shallower and ventilate while you charge to fully charge the banks.

- ⇒ Click the unlit CHARGE button to commence charging your high-pressure air banks. The button is lit when a charge is in progress.
- ⇒ Click the lit CHARGE button to secure the charge.

**TOWED ARRAY:** From this panel you select and deploy the desired towed sonar array (Port or Starboard). The SCOPE field indicates the length or percentage of the array currently streamed.

- ⇒ Click PORT or STARBOARD to select that array to be streamed. Only one towed array can be deployed at a time.
- ⇒ Click STREAM to deploy the array.
- ⇒ To stop streaming or retrieving the array, click OFF.
- ⇒ To retrieve the towed array, click RETRIEVE.

**COURSE:** On this Course Indicator, the red needle indicates current course. The black needle indicates ordered course

- ⇒ Click the desired heading on the Course Indicator to order that course.

**HIGH FREQUENCY SONAR:** The toggle switch activates the High Frequency Active Sonar (HFAS), which is used to detect objects (e.g., mines, icebergs, submarines) at short range. The High Frequency Sonar screen shows the location of any object near your submarine's bow.

- ⇒ Click ON to activate HFAS.
- ⇒ To designate targets (such as mines or icebergs), click on the contact in the HFAS screen. A mark is placed on the Nav Map indicating each return received by the HF sonar.

**VENTILATE:** Ventilation is only necessary when you need to recharge the high-pressure air banks. See HP Air above. The ship must be at snorkel depth (56 ft.) or shallower to ventilate.

- ⇒ Click the unlit VENTILATE button to commence ventilating.
- ⇒ Click the lit VENTILATE button to secure ventilating.

**STERN/BOW/RUDDER:** Your crew controls the bow and stern planes automatically when you change depth but you can control the Rudder.

- ⇒ Click the desired number in the Rudder Indicator to order a Rudder change.
- ⇒ Click zero in the Rudder Indicator or click in the Course Indicator to reset the rudder.

✓ **Note:** The ship will eventually turn in a circle if you do not reset the rudder to zero or order a specific course.

**ENGINE:** This dial, known as an Engine Order Telegraph, orders engine speed. Engine speeds translate to ship speeds as defined in 688(I) *Ship Stations/688(I) Task Bar/Orders Menu*. Flank (maximum) speed modeled for the 688(I) is 35 knots.

- ⇒ Click the desired option to order that Engine Speed.

**EMERGENCY BLOW VALVE:** To surface your ship quickly in an emergency situation, click the red handle to initiate the Emergency Blow procedure. Click again to secure the blow. Remember to recharge your air banks following an Emergency Blow.

**DEPTH:** Actual and ordered depth is shown in feet.

⇒ Click/right-click the digits in the ordered field to order a new depth.

**SPEED:** Actual and ordered speed is shown in knots.

⇒ Click/right-click the digits in the ordered field to order a new speed.

**MBT VENTS:** When on the surface, click the unlit MBT VENTS button to open the main ballast tank vents and submerge the ship. The vents close automatically once the ship is submerged and cannot be opened again until the ship has resurfaced.

✓ **Note:** The ship dives/surfaces automatically when an appropriate depth change is ordered by means of the taskbar depth shortcut, the ORDERED DEPTH window from the Ship Control Station, or by means of one of the Orders Menu's *Navigate>Set Depth* options. It is not necessary to manually open the MBT Vents.

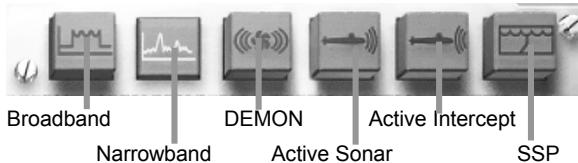
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## 688(I) SONAR STATIONS [F2]

See *Training/Sonar School* for sonar information needed to effectively use the sonar stations.

At the Sonar Stations you monitor the most important sensing equipment on board your sub. Six displays, each with a specific purpose, help detect, identify, track, and localize contacts by employing either active or passive sonar. The sonar suite is composed of these six displays: Broadband, Narrowband, DEMON, Active, Active Intercept, and Sound Speed Profile (SSP). All six stations are explained in this section. For information about UUV sensors and their use see *688(I) Fire Control Suite/Deploying and Wire-Guiding UUVs*.

On all sonar stations six buttons are always visible and permit you to navigate from one Sonar station to another.



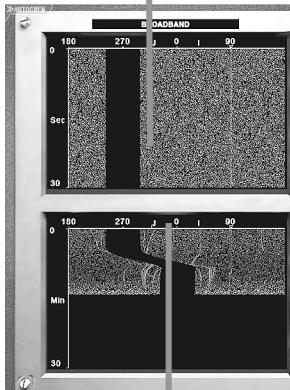
### 688(I) BROADBAND SONAR (PBB)

The Passive Broadband Sonar Station displays input from the spherical bow and towed arrays. These inputs are used to detect and track submarines and surface ships. Here trackers can be assigned to contacts

and they are given an alphanumeric Contact Designation or ID. Contact IDs for all sonar contacts begin with the letter S. Trackers provide the TMA station with updates on the contact's bearing at specified time intervals.

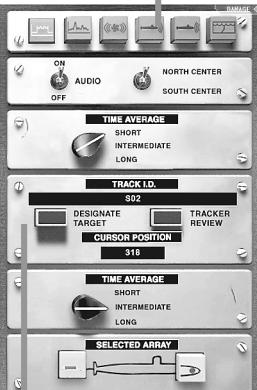
- ✓ **Note:** UUV sonar contacts also have S designations, but their data is not reported in the Sonar Suite. UUV data is available in TMA and on the Nav and Fire Control Maps.

Broadband Waterfall Display



Bearing Indicator

Sonar Navigation Buttons



Broadband Controls Panel

### 688(I): Broadband Waterfall Displays

The 688(I) uses dual waterfall displays to track sonar information. In the waterfall display, sonar information "cascades" down over time giving a sense of the contact's movement. Bearing is displayed on the horizontal axis with either north (000) or south (180) in the center. Time is displayed on the vertical axis, with the most recent information at the top.

Contacts appear as green lines in the waterfall. A faint green line represents a weak contact while a strong contact appears as a brighter, thicker line. The speckled background represents background noise interference. The amount of interference increases as background noise increases. The thin green line beneath the "▽" indicator indicates the direction your submarine's stern is pointing (your "baffles" for your hull and spherical array.)

Both the upper and lower waterfall displays show broadband sonar data. It is a good idea to have one display set on Short Time Average (1–60 seconds) and the other on Intermediate (0–30 minutes) or Long Time Average (0–2 hours). The longer the time averaging that is employed the better the sonar detection processing. However, the longer the time averaging, the longer the time between updates. Both the spherical sensor and the towed array pick up broadband data. The information displayed depends on which sensor is selected.

Ship speed greatly interferes with the ability of the sensors to detect and display contacts. Excessive speed results in the inability to detect any contacts at all. Only background noise is visible.

## **Assigning Trackers in Broadband**

1. Click the desired array on the submarine outline in the SELECTED ARRAY panel to display data from that sensor in the broadband waterfall display.
2. When a contact appears in the waterfall click on it to select it. A vertical cursor appears over the contact in the bearing indicator. You can click and drag this cursor along the bearing indicator.
3. Click DESIGNATE TARGET to designate the target and assign a tracker. (If the signal is faint, you may have to click more than once.)

A tracker letter is placed above the contact line. Four trackers are available for each sonar array.

### **A, B, C, and D: Spherical contacts.**

**E, F, G, and H:** Hull contacts. (These trackers can only be assigned in Narrowband)

**I, J, K, and L:** Towed array contacts.

If the spherical array already has four contacts assigned to trackers (A-D) and you designate a new contact, the oldest tracker is unassigned from its current contact and reassigned to the new contact. This behavior is also true for the hull and towed arrays. To unassign a specific tracker, click on the letter and drag it into the waterfall display and release it.

Each contact you designate is assigned a sequential *Sierra* number: S01, S02, S03, etc. The Sierra number, also called a Contact ID or Track ID, and all available data on the contact are automatically sent to TMA and the Nav Map.

## **Towed Array Contacts**

If the towed array is not already deployed at mission start, stream it from the Ship Control Station [F1]. No towed array contacts appear if the towed array is not streamed. Be aware that towed array contacts do not appear immediately when you deploy the array

Because of the way the physics of the towed array construction, an ambiguous contact, a mirror image of each true contact, appears on the display along with the true contact. If you have a contact at the same bearing on your bow array, you can be fairly certain a contact at a bearing on your towed array display is on contact's true bearing.

If the contact is not visible on another array, changing the course of Ownship allows you to determine which bearing is the actual and which is its mirror image on the display. After you maneuver, one contact remains at

a consistent bearing and one appears to move in the display. The contact's true bearing is that of the contact that remains constant.

When numerous contacts are present or the contacts are close together, this process can be very challenging!

- ✓ **Note:** Be aware that when you turn Ownship your towed array does not begin to turn until it reaches the point in the ocean where the ship began its turn. As a result, Ownship appears as a contact on the towed array during turns.

## **688(I) Broadband Controls Panel**

The buttons and switches of the 688(I)'s Broadband Controls Panel are described here:

**Sonar Navigation Buttons:** Click the icon button of the sonar station you want to visit. Hold your cursor over a button to display the name of the station it represents.

**AUDIO:** When ON, a cursor placed on a sonar contact emits the sound produced by the contact. When OFF, no sound is emitted.

**NORTH CENTER:** Click to center the waterfall display at 000 degrees.

**SOUTH CENTER:** Click to center the waterfall display at 180 degrees.

**TIME AVERAGE (Upper Waterfall):** Click the desired text (SHORT, INTERMEDIATE or LONG) to select the time average setting for the upper waterfall display.

**TRACK ID:** Displays the alphanumeric Track ID (also called the Contact ID in this manual) of the selected track.

**DESIGNATE TARGET:** To place a tracker on a contact and assign a Track ID click the contact in the waterfall display then click Designate Target. A Track ID number (S01, S02, S03, etc.) is assigned to the contact and the sensor data is sent to TMA and the Nav Map.

**TRACKER REVIEW:** Click to cycle through all assigned trackers for the selected array. The Track ID is displayed in the Track ID field.

**CURSOR POSITION:** Indicates the bearing at the location of the vertical cursor in the Bearing Indicator section of the waterfall display or cursor location of the tracker when a tracker is selected with the Tracker Review button.

**TIME AVERAGE (Lower Waterfall):** Click the desired text (SHORT, INTERMEDIATE or LONG) to select the time average setting for the lower waterfall display.

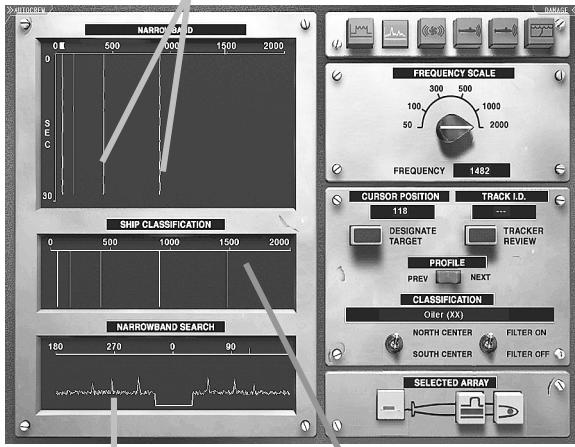
**SELECT ARRAY:** The two buttons represent the spherical array (in the bow) or the towed array (aft). Click the desired button to display that sensor's input in the waterfall display.

## 688(I) NARROWBAND SONAR (PNB)

Each ship class has a unique sound frequency signature. The Narrowband function is used to classify sonar contacts by comparing the frequency signature of the selected contact against a database of known frequency signatures.

The ship's computer narrows your search by presenting only those signatures that have similarities to the signature of the selected contact.

Detected frequencies



Contact in Narrowband Search

Sound Profile of selected class

### 688(I) Narrowband Displays

On the left side to the Narrowband station are three display windows: Narrowband, Ship Classification and Narrowband Search. Each is described below followed by the other components on the right side of the Narrowband Station.

**NARROWBAND:** The Narrowband Waterfall display in the upper left of the station separates a signal on the bearing selected in the Narrowband Search Display into discrete frequencies. The horizontal axis represents the range of frequencies and the vertical axis represents time in seconds. The frequency range is adjustable using the frequency scale dial as described below. Vertical lines represent specific frequencies in the sound signal emitted by the selected contact. Together these lines represent the contact's sonar signature or profile.

- ✓ **Note:** Straight lines indicate a consistent signal. Curved or wavy vertical lines represent distortions in the signal. Faint lines indicate a weak signal.

**SHIP CLASSIFICATION:** This window displays the sound signature of the class or weapon named in the CLASSIFICATION field. Compare the profile

of the selected contact to profiles in the ships profile database. Use the PROFILE selector to cycle through the available signatures.

**NARROWBAND SEARCH:** Signals from the selected array display in an A-scan format on the Narrowband Search Display. A contact's signal displays as a spike at the bearing where it is detected. The height of the spike represents signal strength. High peaks indicate strong signal strength. Click the peak of a contact to select the contact and display its profile in the Narrowband waterfall display.

- ✓ **Note:** Ownship's speed can affect your ability to detect contacts in Narrowband Search. When the entire signal line is near the top of the display this indicates that background noise is very high. This usually happens when ship's speed is over 5 knots for hull array contacts or over 15 knots for towed array contacts. Decrease your speed to reduce water flow over the array.

The right side of the Narrowband station contains the following buttons and functionality.

**Sonar Navigation Buttons:** Click the desired button to switch to that station in the 688(I)'s Sonar Suite.

**FREQUENCY SCALE:** Click the desired number to switch to that frequency range in the waterfall display.

**FREQUENCY:** Click the desired line in the Narrowband Waterfall display. The cursor moves to that location in the frequency indicator.

**CURSOR POSITION:** Click in Narrowband Search to display the precise bearing at that location.

**TRACK ID:** The alphanumeric Track ID (also called Contact ID) displays in the Track ID window when a tracker is designated in the Waterfall Display.

**TRACKER REVIEW:** Click to cycle through any Track IDs that are assigned Trackers for the selected array. The cursor jumps to that contact

**DESIGNATE TARGET:** Click to assign a Target ID (Track ID) and tracker to the contact line selected in the Narrowband Waterfall Display.

### ***Designating Tracks/Assigning Trackers in PNB***

1. Find a contact in the Narrowband Search Display and click on the peak of the contact. When a contact is selected lines indicating detected frequencies appear in the Narrowband Waterfall Display.
2. Click one of the vertical frequency lines in the Narrowband Waterfall Display. The vertical cursor appears on the bearing indicator at the location of the line.
3. Click DESIGNATE TARGET. A tracker letter appears on the bearing indicator, and an alphanumeric tag appears in the TRACK ID window. Tracking data is sent automatically to TMA. Assigning a tracker here may un-assign a tracker from a contact in broadband if all trackers are currently assigned.

✓ **Note:** If the signal is weak you may have to click more than once to designate the contact and assign the tracker. You cannot assign a tracker while the game is paused.

**PROFILE:** The ship's computer compares the sonar signature in the Narrowband Waterfall display against those in its sound profile database. Only those signatures that are similar to that of the selected contact are presented for review when FILTER ON is selected.

⇒ Click the **PREV/NEXT** rocker switch to view the signature profiles. If FILTER ON is selected, only ships or weapons that have a profile similar to that of the selected contact are available. All platforms and weapons in the game are available for review if FILTER OFF is selected.

**CLASSIFICATION:** This window displays the name of the class or weapon selected with the PROFILE selector. The sound signature profile of the class name selected here appears in the Ship Classification Display.

**NORTH CENTER:** Click to place bearing 000 at the center of the Narrowband Search Display.

**SOUTH CENTER:** Click to place bearing 180 at the center of the Narrowband Search Display.

**SELECTED ARRAY:** Click the appropriate button to display data from the selected array in the Narrowband Search. The button in the bow of the sub outline represents the Spherical array, the button in the middle in represents the Hull array, and the aft button represents the Towed array.

✓ **Note:** The towed array must be deployed before any towed array signals can be detected.

## **Classifying Contacts In Narrowband**

1. Select a contact in the Narrowband Search window by clicking on the highest point of the peak. Detected frequencies appear in the Narrowband Waterfall.
2. Set the filter toggle to FILTER ON below the Classification field.
3. Click NEXT or PREVIOUS to select a class or weapon name in the Classification field and view its sound signature profile in the Ship Classification window.
4. Compare the frequencies of the selected contact in the Narrowband Waterfall Display to those of the class selected in the Ship Classification window. Adjust the frequency range to better see distinct ranges.
5. When you decide which ship's signature best matches that of the selected contact, simply leave that class name selected in the Classification field, and click Designate Target. The name showing in the Classification field is assigned to the contact in the Nav Map.

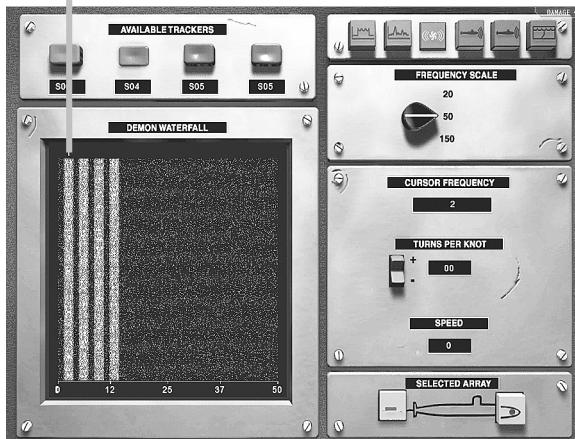
- You must still assign an alliance ID and a level of confidence from the Nav Map using the right-click *Contact Menu>Classify Contact...* option.

## 688(I) DEMON SONAR STATION

DEMON is an acronym for Demodulated Noise. The DEMON function is used primarily to determine a contact's speed. This is important information when establishing an accurate firing solution. Once contact speed is determined at the DEMON Station the value can be entered in the speed field in the TMA trial solution field for the appropriate contact.

The main component of the DEMON Station is the DEMON Waterfall Display. The waterfall display separates the selected signal into demodulated components. On the display, the horizontal axis represents frequency and the vertical axis represents time. When a contact is selected its signal appears as parallel vertical lines in the waterfall. The lines represent sound generated by the contact's propeller blades.

Select the first line



To determine a contact's speed accurately you must have classified the contact in Narrowband, ESM or Periscope. The number of turns per knot (TPK) produced by a specific class is listed in the USNI Information for that class. The steps for using DEMON to determine a contact's speed and how to use DEMON to determine a contact's type are shown below. The DEMON Station Interface and button description for each sub class follows the instructions.

### Using DEMON to Calculate Speed

1. First determine the class of the contact in Narrowband, ESM or the Stadiometer. In the USNI Browser, find the entry for the ship or sub's class and make note of the turns per knot number listed in the TPK field.

2. Ensure that there is a tracker assigned to the desired contact in Broadband sonar.
3. In SELECTED ARRAY click the desired sensor button in the submarine outline. The button on the bow of the outline selects the Bow Array. The aft button selects the Towed Array.
4. Under AVAILABLE TRACKERS click the button associated with the desired track ID. As long as the tracker is still tracking lines appear in the waterfall display.

✓ **Note:** If the game is paused, no lines appear in the waterfall display.

5. If necessary, adjust the frequency to better view the signal. If the lines in the display seem to blur together, switch to a lower frequency range. If the lines run off the right edge of the display, increase the frequency range. To adjust the frequency range, click the desired number in the FREQUENCY SCALE switch.
6. Determine the Turns per Knot (TPK) for the contact by looking up the U.S. Naval Institute Reference entry for the known platform class.
7. Place the waterfall cursor over the line farthest left.
8. Click the + or - toggle in the Turns Per Knot panel to set the desired value for the known contact as determined in USNI Reference. The speed of the target appears in the SPEED field below the buttons.
9. When you have determined the speed of the contact, enter that speed in the TMA SPEED field for the selected contact on the TMA Station.

### **Using DEMON to Determine Category**

By determining the number of blades on a contact's propeller, listening to the sounds it emits and observing the contact's behavior you can make an educated guess as to the category of the contact.

1. Select a sonar array as described above.
2. Select a sonar contact by clicking on a tracker button as described above. Vertical lines appear in the waterfall. The first line on the left indicates the shaft rotation speed. The other lines indicate individual blades on the propeller.
3. If necessary, adjust the frequency scale until the lines display clearly and individually on the waterfall.

### **Use the following criteria to help categorize the selected contact:**

**Merchant Vessels/Tankers:** Typically three or four blades; noisy; often maintains predictable course.

**Warships:** Typically four or five-bladed propellers; quieter, smoother sound than merchant ships; possibly unpredictable course changes.

**Submarines:** Five, six or seven-bladed propellers; very quiet when submerged and at low speed; unpredictable course changes.

**Fishing Vessels/Trawlers/Pleasure Craft:** Three- or four-bladed propellers; noisy; erratic courses and speeds, frequently stopping and starting.

- ✓ **Note:** Turns per knot for military and civilian ships are found in USNI Reference. Click **CIVILIAN** in the Country column then the name of the ship type to find TPK information on Civilian ships.

## 688(I) ACTIVE SONAR STATION

Active sonar should be used only when absolutely necessary since it provides the enemy with a wealth of information. *S.C.S. - Dangerous Waters* models both medium and high frequency active sonar for the 688(I) class submarines

### Medium Frequency (MF) Active Sonar

The bow array in active mode is used to detect and track contacts. Echoes from a single ping or a series of pings are used to determine an object's bearing and range. Information from a medium frequency active search is sent to the TMA station for use in plotting a firing solution for the given contact. While this information is very useful to you, it comes at a price. Using active sonar gives away your bearing and alerts any ship in the area to your presence. The ship may well assume you have hostile intentions since active sonar is used primarily for targeting.

#### MF Active Sonar Display

In the 688(I) 's rectangular Active Sonar Display, the area at the bottom of the display represents objects closest to your ship. The horizontal line at the top represents bearing. The display updates from the bottom up. In continuous mode each subsequent ping replaces the oldest data with the newest.

The display shows the results of active sonar echo ranging. Speckled areas represent echoes from the ocean background, reverberation, in general. The area of blank space represents the area behind your ship, active sonar baffles. Since the signals transmitted from your bow array cannot reach the area behind your ship, no echoes are returned from that area.



Bearing-Range Cursor

**Active Sonar Contacts:** Contacts appear as bright green spots on the active display. A metallic ring is heard as each contact displays. The active display shows a four-ping history, which is useful in detecting contacts with weak signal strength

**The Bearing-Range Cursor:** The cursor in the active display consists of a square attached to a vertical line that indicates a specific bearing. The distance of the cursor from the bottom of the display represents its range from Ownship. The position of the vertical line on the Bearing Indicator represents the bearing of the cursor. To move the cursor, click the desired location on the display.

### **Marking Tracks with MF Active Sonar**

1. Click the number of the desired range on the Range Scale (KYDS) selector. Longer ranges are appropriate for the initial search. Once a contact is detected, you can adjust the range scale of subsequent transmissions to improve the accuracy.
2. Selecting a new range halts continuous transmissions. You must click transmit again to resume transmissions.
3. Click NORTH CENTERED or SOUTH CENTERED to center the display on a bearing of either 000 or 180 degrees.
4. In ECHO RANGING select SINGLE or CONTINUOUS pings. If Single is selected, only one active sonar ping is transmitted. When Continuous is chosen, active sonar pings are transmitted at a set interval until the switch is reset to Single or you change the range scale.
5. Click TRANSMIT to send transmissions of the selected type with the toggle switch.

- ✓ **Note:** To stop the transmission of continuous pings, click again on the TRANSMIT button.

☐ A valid contact gives consistent visual returns that are brighter than background noise or reverberations. The audio return will have a distinctive metallic ring to it and will be distinguishable from the background noise.

6. Click on a contact to select it with the Bearing-Range cursor or click and drag the cursor to center it on the contact. The contact's range and bearing display in the RANGE/BEARING panel. Range is in yards.
7. Click MARK to assign an alphanumeric Track ID to the selected contact. Once a selected contact has been marked once, select it and click MARK again to send an update of the contact's range and bearing to TMA and the Nav Map. The NTDS symbol for contacts marked with Active Sonar appear on the Nav Map on the detected bearing and at the detected range at the end of a green line of bearing (LOB)

- ✓ **Note:** The bow array has only four trackers. If you have all four trackers assigned in Broadband or Narrowband and designate a target in Active Sonar, the oldest tracker is removed from a Broadband or Narrowband contact for use in Active.

## **688(I) High Frequency Active Sonar (HFAS)**

High Frequency Active Sonar (HFAS) has a shorter range and can detect smaller objects than medium frequency active sonar. When you must navigate a minefield, HFAS can be used to locate and mark mines near your ship. Once a mine is located, maneuver quickly to avoid it by the largest possible margin. Driving slowly provides the best reaction time. Marking the mines helps you keep track of the location of the mines should you need to traverse the field again when you leave the area.

In S.C.S. - *Dangerous Waters*, the High Frequency Sonar screen shows the location of any object near your submarine's bow. If an object is close enough, clicking on it designates it and any other object detected by the sonar as a HF sonar contact on the Nav Map. The 688(I)'s High Frequency sonar interface is located on the Ship Control Station. The 688(I) also has an Ice Thickness detector accessible from the Periscope Station. See *688(I) Stations/688(I) Periscope-Stadimeter Stations/Ice Thickness Indicator* for information for more information.

### **To View and Mark Contacts with High Frequency Sonar**

1. Press [F1] or select the Ship Control Station from the pop-up Stations Menu to move to the Ship Control Station.

☐ The HFAS system is located in the center portion of the station. The toggle switch activates the High Frequency Sonar System (HFSS), which is used to detect small objects and ice keels at short range.

✓ **Note:** To locate a polynya, an area of thin ice or open water, during under ice operations it is necessary to use the Ice Thickness indicator accessible from the Periscope Station.

2. Click ON to activate the High Frequency Sonar,
3. Click the HFAS Display to place a marker on the Nav Map for all contacts detected by the sensor. No Track IDs are assigned to HFAS contacts and no information is sent to TMA. But these marks on the Nav Map are very useful for navigating and returning back through a minefield.

## ACTIVE INTERCEPT SONAR STATION

The Active Intercept function alerts you to the presence of active sonar transmissions from another ship, sub, dipping sonar or sonobuoy in the area. It provides the bearing of the transmitting entity as well as the frequency of the detected emission, the age of the last signal and the strength of the signal. Knowing the signal strength can assist you in determining the relative proximity of the active sonar source.

When Active Intercept detects an active sonar ping, a line is seen on the True Bearing Indicator display on the bearing of the contact. The strength of the signal is represented as a continuum of colored lights directly below the display that move from green to red as the signal grows in strength.

The 688(I)'s Active Intercept Station is made up of the following components:

**TRUE BEARING INDICATOR:** A line from the center of this circular display to its outer edge indicates the bearing of an intercepted signal. Thicker lines indicate a strong signal. A triangular cursor is used to select a signal on a specific bearing.

**SIGNAL STRENGTH:** Indicates the strength of the selected signal. Green indicates a weaker signal, red a stronger one. In general, assume the source of a red signal is nearby.

**FREQUENCY:** Displays the frequency of the intercepted signal. (Active Sonar Frequencies for platforms and torpedoes as modeled in S.C.S. – Dangerous Waters can be found in the USNI Browser in the SENSORS entry.)

**BEARING:** Displays the precise bearing of the intercepted signal.

**INTERVAL:** Displays the interval between the last two signals.

**AGE:** Displays the time in seconds since the last signal.

**MARK:** When a contact is detected and visible on the Active Intercept Display, clicking the Mark button assigns a Contact ID to the signal and sends the bearing information to TMA. Each time that you click mark when the signal is selected, the current bearing of that contact is sent to TMA.

- ⇒ Click on a signal line in the True Bearing Indicator display. The cursor moves to select that bearing. When the contact's signal is selected, click MARK.

## 688(I) SSP SONAR STATION

The Sound Speed Profile (SSP) Station displays the speed at which sound is transmitted at various water depths in the area around Ownship. Ocean water typically forms distinct layers of density that can profoundly affect sonar transmissions. Warmer, less dense water forms the upper surface duct—below this, temperatures fall off sharply and density increases. The effect of this process is sound generated in one layer doesn't tend to transmit easily to the other layer, and vice versa. At the beginning of any mission, always check the depth at which the surface duct separates from the lower thermal. (See *Training/Sonar School/Underwater Sound Propagation* for more information on thermal layers.)

The Sound Speed Profile is created from information returned from an Expendable Bathythermograph (XBT) probe. When launched, the probe reports depth and sound speed information in both graph and table form.

### **Launching an XBT probe**

The results of the last XBT probe are visible in the display window and on the clipboard when the SSP station is first entered.

- ⇒ Click the XBT button. The previous results are cleared from the display and the clipboard when a new XBT is launched.
- ❑ Updated information does not appear instantly on the screen. The XBT probe rises to the surface and then descends before it begins reporting. This may result in a delay before the SSP updates. The layer depth is noted at the bottom of the clipboard.
- ❑ Depth scale cannot be changed in the 688(I) SSP graph.

✓ **Note:** Due to varying water temperatures at locations around the world, a distinct thermal layer is not always present. The mission designer designates the type of layer for the mission.

## 688(I) UUV SONAR

In S.C.S. - *Dangerous Waters* all submarines are given Unmanned Underwater Vehicles (UUVs). These UUVs act as remote sonar sensors. Merging TMA bearing information provided by a remote sensor with data from your ship's sensors can provide a fairly accurate assessment of the range to a contact. UUVs are particularly useful when navigating a minefield and can be operated in Passive or Active mode.

The UUV itself appears as a contact in the Broadband and Narrowband Displays but UUV sonar returns are not viewed in the Sonar Suite. UUV sonar contacts display on the Nav and Fire Control maps and in TMA.

UUVs are launched from the Fire Control Station and are wire-guided like torpedoes from there. See *688(I) Stations/688(I) Fire Control Suite/Deploying and Wire-Guiding UUVs* for complete information.

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## 688(I) RADAR STATION [F3]

Submarine radar should be used with caution and only when the situation mandates its use. When you use radar you communicate your presence, your bearing, your proximity and who you are if the other platform is equipped with EW or ESM equipment.

### MARKING CONTACTS WITH RADAR

1. Ensure that Ownership is at 54 feet or less and moving at 8 knots or less if the sail is submerged.
2. Click RAISE in the RADAR MAST Panel in the upper right of the station to raise the mast. The RADAR READY light glows continuously when the radar mast is extended and radiating.
3. Set RANGE SCALE as desired and set the RANGE RING toggle switch to ON if range rings are desired on the radar display.
4. Contacts show up as brighter orange spots on the display. Click on a contact to select it with the Bearing-Range Cursor or click and drag the cursor to center it on a contact.
5. Click MARK to send the contact's bearing and range to TMA and the Nav Map.

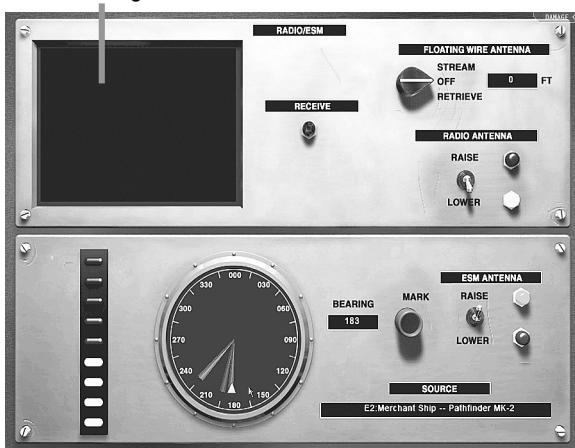
✓ **Note:** Radiating while the radar is submerged destroys your radar.

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## 688(I) RADIO-ESM STATION [F4]

In S.C.S. - *Dangerous Waters* the Radio Room and the ESM (Electronic Support Measures) stations are combined. The radio is used to receive message traffic and send position updates while underway. The ESM console allows you to detect and classify contacts when the ESM mast is extended.

Radio Message Window



## RADIO ROOM

The upper portion of the Radio-ESM console represents the Radio Room. Here messages containing important intelligence and tasking information are received and contact positions are downloaded from any platforms in the mission that are part of your Link network.

When your submarine starts a mission submerged, you see no Link data on the Nav Map even though Show Link Data is on by default. To determine if there are Ownside platforms (members of the Link) in your area you must come to communications depth (comms depth) and follow the steps below. When Link information is downloaded, any surface and air Link participants and any contacts they have detected appear on the Nav Map. You may never see the symbol for any submerged Link participant that is in the mission since he must be at comms depth with his mast extended at the same time you are downloading data for you to see him

## RECEIVING RADIO MESSAGES AND LINK DATA

To receive messages you must come to Communications Depth (Comms Depth) and raise the radio mast or stream the floating wire antenna. There are advantages and disadvantages to both modes. The radio mast receives messages more quickly but exposing the mast leaves you vulnerable to detection. The floating wire receives messages far more slowly but you do not need to expose a mast to receive messages. Follow these instructions to deploy the radio mast or floating wire.

1. Select either the floating wire antenna or the radio antenna mast to receive the message.

**Radio Mast:** Take the ship to **63 ft** and set ship speed to 10 knots or less when the sail is submerged to avoid damaging the mast when it is

raised. In the Radio Antenna panel click RAISE to extend the Radio Mast.

**Streaming Wire:** You do not have to come to Comms Depth but it helps to be fairly near the surface. Set ship's speed to 18 knots or less to avoid damaging the wire. Slower speeds allow the wire to float up more quickly. If speed exceeds 5 knots, the wire may never reach the surface of the water. Make sure the wire is streamed to at least half of its length in order to ensure message reception. In the Streaming Wire panel click STREAM. The readout below the switch indicates the length of the wire that is currently deployed. Click STOP when the desired length has been deployed.

2. Look at the message screen for incoming messages. A scroll bar appears in the message window if there are more messages than can be displayed at one time. The newest message traffic is always at the bottom of the scrolling text. Message traffic may not appear immediately. When a message is received, the INCOMING MESSAGE light glows briefly.
3. Look on the Nav Map if you are waiting for Link data to determine when the information has been downloaded.
  - Single player mode: If another Ownside platform in the mission is a submarine, you must both be at comms depth with a mast or the antenna deployed before you see him as part of your Link Data. Since it is unlikely that these conditions will be met, you may never see an Ownside sub in your Link download.
  - Multiplayer mode: If another Ownside sub is player driven, you *both* must be at comms depth with the radio mast extended at the same time before you will see each other. If you have your radio mast extended and he has his floating wire out, he will see you but you will not see him. The radio mast is needed to transmit position data.
4. After the desired information has been received, click LOWER to lower the Radio Mast or RETRIEVE to retrieve the streaming wire.

✓ **Note:** Radio message text also appears in the Radio History Window on the Task Bar. When a new message is received, the radio history selection button (the green square) on the Task Bar flashes until the button is selected. You can raise and lower the radio mast from the Task Bar's Orders Menu from any screen provided you are at a safe depth and speed.

## PROMOTING CONTACTS TO THE LINK

In some cases the Link participants in your area could be unaware of a contact that you have detected if the contact is out of range of their combined sensors. In this case you may want to promote your contact to the Link to share it with other link participants in your area. (Your contacts

are not automatically shared with the Link participants as theirs are shared with you in single player games.)

During Multiplayer games, contacts detected by Ownside platforms controlled by other players do not share data across the link automatically as the AI. Ownside platforms do. Part of your task in Multiplayer games is to promote your contacts to the Link so that other Ownside Link players can see your contacts. Other players must promote their contacts before you are able to see them on the Nav Map. You are only able to see them when Show Link Data is on.

Just as you must raise your radio antenna or float the wire to download Link updates, you must also come to comms depth and raise the radio mast before you can to promote your contacts to the Link.

1. Come to comms depth (**63 ft**) and raise the radio antenna.
2. From the Nav Map, select the contact you want to promote. From its Contact Menu (right-click menu) classify the contact as surface or subsurface if known and apply any alliance or class information that you have to the contact.
3. If possible, determine an accurate firing solution and enter it at the TMA station.
4. From the Contact Menu select Promote to Link. In the DDI a new field appears labeled "**Promoted**". This field displays the time in the mission at which you promoted the contact to the Link.

The contact's symbol appears on the Nav Map of all players in a multiplayer game that are part of Ownside and have access to the Link. A 4-digit track ID is assigned based on your Platform ID. This 4-digit number is seen in parentheses following the time of promotion in the "Promoted" field. In single player games, AI platforms attack contacts that you have promoted as hostile. The AI investigates contacts promoted as Unknown. *See Navigation Station/2D Navigation Map/Contact Menu/Promoting a Contact to Link* for full information on promoting a contact to Link.

## **688(I) ELECTRONIC SUPPORT MEASURES (ESM)**

The ESM mast is designed for the passive detection of radar emissions. This sensor detects any platform in your area that is employing radar. Because you must have the ESM mast exposed, you make your ship vulnerable to detection when using ESM.

The ESM sensor provides a bearing to detected contacts. The ship's computer analyses the detected transmission and compares it to those in its database and provides the class name of the transmitting platform.

### **Detecting/Classifying Contacts with ESM**

1. Come to **58 feet** and maintain a speed of 10 knots or less if the sail is submerged before raising the ESM mast.

2. Click the ESM ANTENNA switch to the RAISE position. When the triangular cursor appears in the ESM Display, the ESM is in detection mode. Contacts appear as lines emanating from the center of the display on a specific bearing.
3. Click a contact signal in the ESM Display to determine contact bearing and to view the source of the signal. (The name of the detected emitter appears in the SOURCE field.) The bearing of the contact appears in the Bearing readout.
4. Take note of the intensity of the contact on the ESM Display and the number of ESM Signal Strength Indicator lights that are lit. A strong signal can indicate that the contact is relatively close. (Green indicates a weaker signal, red a strong one.)
5. Click a contact signal to select it then click MARK. This assigns an alphanumeric Track ID to the contact and sends the bearing information to TMA and the Nav Map. ESM contacts have **E** designations (E01, E02, etc.) Once marked the Contact ID appears in front of the emitter name in the SOURCE field.

When MARK is clicked, the contact selected in the ESM display is automatically assigned a classification determined by the ship's computer. This classification is based on platforms known to carry the detected emitter shown in the SOURCE field. When the contact is selected on the Nav Map the DDI will list that class name in the CLASS field. You must still assign an ID (Hostile, Friendly etc.) from the Contact Menu on the Nav Map.

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## **688(I) NAVIGATION STATION [F5]**

The Navigation Station, with its Nav Map and 3D View is the default view when entering a mission. The Navigation Station functions the same regardless of controllable platform and the basics are covered only once in this manual in *Navigation Station*.

The *Navigation Station* section covers how to play from the Nav, what is seen on the Nav Map, how contacts are numbered, the 3D View and information on what is seen when various filters are applied. The 688(I)'s Task Bar is covered in this section. Several options relative to the Navigation Station are unique to the submarines in *S.C.S. – Dangerous Waters*. These are described below.

## **688(I) OWNSHIP/ORDERS MENUS**

To access the Ownship Menu, click the Ownship NTDS symbol on the Nav Map to select it, then right-click on the Ownship symbol. The majority of the 688(I)'s Ownship Menu items are identical to those in the Task Bar Orders Menu. See *688(I) Stations/688(I) Task Bar/Orders Menu* for a description of those menu items. The rest of the Ownship Options require the use of the Nav Map. These are the same from platform to platform. See *Navigation Station/2D Navigation Map/Ownship Menu*. The following item is seen only on the submarines and the FFG in *S.C.S. – Dangerous Waters*.

**Fire Tube [X]:** This option appears in the Ownship Menu only when a target is assigned to a tube and the tube is readied to fire in the Fire Control Station. When all that is left to do is fire the tube, this option is available. Select it from the Orders Menu to fire the designated tube from any station.

## 688(I) CONTACT MENU

The Contact Menu appears whenever you right-click on a selected contact's NTDS symbol. Most menu items are the same from platform to platform. See *Navigation Station/2D Navigation Map/Contact Menu*. Several options are unique to the subs in S.C.S. – *Dangerous Waters*.

**Engage With:** For information on the weapons that appear in the *Engage With* menu See *688(I) Stations/688(I) Fire Control Suite/ 688(I) Tactical Weapons* and *688(I) Strategic Weapons*. Only weapons appropriate to the selected target are available. Others are greyed out. If the launch parameters are not met for a specific weapon it is unavailable until Ownship is at the appropriate depth and speed for launching the weapon.

**Spec Ops:** This option is only visible when the mission designer has included the Deep Submergence Rescue Vehicle (DSRV) or a Special Forces team in the mission. It displays a submenu of Special Operations. Look for tasking messages in the mission for specifics on deploying the special ops units during gameplay.

**Deploy DSRV:** Select this option to Deploy the Deep Submergence Rescue Vehicle to travel to the selected contact. This option is only selectable when the following conditions are met:

- The DSRV is present on the Sub's hull. (The DSRV is only available if the mission creator added it to the mission.)
- The selected contact is a submerged submarine.
- Ownship depth is greater than periscope depth.
- Ownship speed is 3 knots or less.

**Deploy Special Forces:** Select this option to deploy Special Forces against the selected contact. This menu item is greyed out until the following requirements are met:

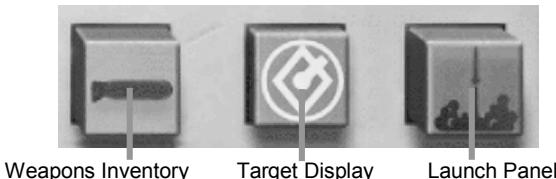
- The selected contact is a surface ship or landbased target (Category: Stationary) such as a building or the floating Oil Rig.)
- Ownship has Special Forces aboard.
- Ownship is traveling at periscope depth or less and at 3 knots or less.

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## 688(I) FIRE CONTROL SUITE [F6]

From the stations of the Fire Control Suite [F6] weapons are selected, contacts are targeted, weapons are launched and countermeasures are deployed.

The 688(I)'s Fire Control Suite consists of three stations: the Target Display, the Launch Panel and the Weapons Inventory. These stations are reached by clicking one of the navigation buttons at the bottom right of the 688(I)'s Fire Control Stations. Target Display is seen as default at game start.



Weapons Inventory

Target Display

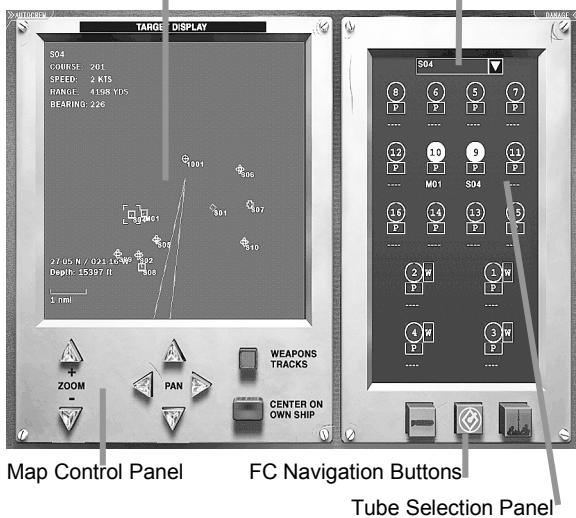
Launch Panel

## 688(I) FIRE CONTROL TARGET DISPLAY

The 688(I) Target Display contains the Fire Control map, the Target Selection List, the Tube Selection Panel and the Map Control Panel. These areas are described briefly here. See *688(I) Stations/688(I) Fire Control Suite/688(I) Launch Panel/Basic Launch Procedure* for information on how to use the displays and panels to launch weapons, mines and countermeasures.

Fire Control Map

Target Selection List



Map Control Panel

FC Navigation Buttons

Tube Selection Panel

### 688(I) Fire Control Target Display

#### Fire Control Map

All sensor contact symbols seen on the Nav Map are also seen on the Fire Control map. If you have Show Link Data on, Link participant symbols and Link contacts symbols also appear. The TMA or Link solution data for a selected contact appears in the upper left corner of the map in the Fire

Control DDI area. This solution data is constantly updated assuming the course and speed designated when the solution was entered in TMA or provided by the Link. This information is used by the Fire Control System to predict the location of the target so the weapon can steer an intercept course until it is close enough to detect the target and begin homing.

You are allowed to target Link contacts as well as Link participants from the Fire Control Station, however the latter is not recommended. Link contacts are only available if you have first downloaded Link data. Link contact positions are not updated once you lose radio contact.

- ✓ **Note:** If Show Truth is ON, no Contact IDs appear in the Target Selection List. Only Snapshots (bearing only) can be assigned to a weapon.

## **Fire Control Map Controls**

Below the Fire Control Map are several buttons used to help narrow the view or display only the data that you wish to see.

**PAN:** When the map is zoomed in, click the PAN buttons (or click and drag on the map or use the keyboard arrow keys) to adjust the map view.

**ZOOM:** Click + in the ZOOM controls (or press [CTRL] and click the map) to zoom in on the clicked location. Click - in the ZOOM controls (or press [CTRL] and right-click) to zoom out.

**WEAPON TRACKS:** When this button is ON (lit) all waypoints assigned to any land attack missile or mine display on the map. When this option is OFF only the waypoints for the weapon assigned to the selected contact show on the map. Click to toggle the state of this button.

**CENTER ON OWNSHIP:** When this button is ON (lit) the Ownship symbol is centered in the Fire Control map when the map is zoomed.

**Keyboard Controls:** When the cursor is in the map, press [SHIFT] + X to toggle the display of the Longitude and Latitude and depth display. Select [SHIFT] + Z to toggle the display of the range scale.

## **Fire Control Target Selection List**

At the top of the Tube Selection Panel area is the Target Selection list. This drop-down list contains all of the contacts currently marked by Ownship or by the Link if Show Link is ON. A Track ID selected in this list is available for assignment to a specific tube as described below with the following caveats.

**Contact with a LOB:** Track IDs for contacts with a line of bearing (no TMA solution) cannot be assigned to a tube. They can be targeted with a snapshot.

- ⇒ Create a TMA solution for the contact to make it available for tube assignment.

**Unknown Category Contacts:** Track IDs for contacts that have a TMA solution but have not yet been classified as either a surface or sub surface platform type cannot be assigned to a tube. See Note In *Tube Selection Panel* below. A snapshot can be assigned.

- ⇒ Select the contact in the Nav Map then right-click on the contact to bring up the Contact Menu. From the *Designate Category/ID>Platform Category* option designate it as surface or subsurface to make it assignable.

### **Tube Selection Panel**

From the Tube Selection Panel contacts are assigned to specific tubes and weapon presets are entered. The torpedo wire guide controls for the internal tubes are also accessed from this panel.

A numeral represents each of the 688(I)'s four internal torpedo tubes and twelve vertical launch tubes.

- ✓ **Note:** The 688(I)'s Vertical Launch System (VLS) tubes cannot be reloaded while underway.

The four internal tubes are numbered 1 through 4; the twelve VLS tubes are 5 through 16. The internal tubes occupy the lower portion of the Tube Selection Panel.

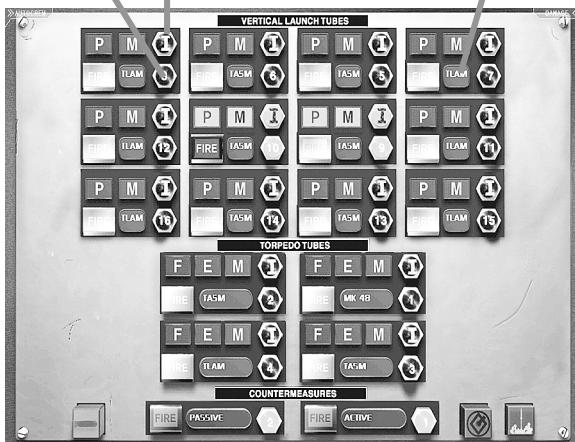
- ⇒ Select a contact ID from the Target Selection List.
- ⇒ Click the number of the desired tube to assign the weapon in that tube to the selected target.

- ✓ **Note:** Certain weapons can only be used against specific types of contacts. For example, you are not able to assign a sub-only weapon to a target designated as surface. Until a contact is classified as surface or subsurface, it cannot be assigned to any tube.

## **688(I) FIRE CONTROL LAUNCH PANEL**

From the Launch Panel weapons selected in the Target Display are launched. Prior to launching a weapon the tube must be flooded, the pressure equalized and the muzzle door opened. The weapon can now be fired. Once the launch procedure is initiated for a tube, the name of the weapon in the window is greyed out and the weapon cannot be changed until the launch procedure is halted and the steps reversed.

Tube Number      Interlock Indicator Light      Name of Weapon loaded



### 688(I) Fire Control Launch Panel

#### Basic Launch Procedure

1. Assign a target to a tube in the Target Display and assign Preset values as described above, then find the corresponding tube number in the Launch Panel.
2. Click **F** to flood the tube.
3. Click **E** to equalize the water pressure in the tube.
4. Click **M** to open the muzzle door. The tube number and the interlock lights illuminate indicating the weapon is ready to fire.
5. Click **FIRE** to lift the cover; click again to fire the weapon. When the tube is empty, the red interlock light to the left of the weapon name window goes dark and the word EMPTY appears in the window.

✓ **Note:** If you have not yet assigned a target to the tube, the FIRE button is disabled and the tube number does not illuminate. Once a target is assigned in the Target Display the tube number illuminates and the FIRE button is enabled.

6. To wire-guide a torpedo with that capability return to the Target Display screen and click the **W** under the tube number. **W** stands for wire guidance. See *688(I) Stations/688(I) Fire Control Suite /Targeting Sea Contacts /Torpedo Wire Guide Controls*.

**Tip:** If a tube number does not light up and the Fire button does not respond check to make sure there is a target assigned to the tube. Also check the High-Pressure Air bank in Ship Control. A weapon launch

requires a charge of at least 50% in your air banks. See 688(I) *Ship Control* for information on charging the air banks.

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### To Reverse the Launch Process Prior to Firing:

Until the weapon is actually fired, the launch process can be reversed. In this situation the steps must be manually reversed, one step at a time. The muzzle doors must be closed and the tube re-pressurized and drained allowing a different weapon to be loaded.

- ⇒ Click the buttons in the reverse order (**M** then **E** then **F**) to prepare the tube for reload. The button flashes and goes dark indicating the next button can be clicked. Reload the tube as described below.

✓ **Note:** This reverse process happens automatically when **M** is clicked after a weapon has been fired.

### VLS Tube Launch Procedure

In the 688 TLAMs and TASMs can be fired from the Vertical Launch Tubes.

1. Assign waypoints for a TLAM or assigned a target to a tube containing a TASMS; locate that tube number in the Launch Panel.
2. Click **P** to pressurize the tube.
3. Click **M** to open the muzzle door. The **I** lights up, indicating that the inter-locks have been met to fire the weapon and the tube number lights up.
4. Click **FIRE** once to lift the cover, then click again to fire the weapon.

### Countermeasure Launch Procedure

Countermeasures are launched from the two tubes in the COUNTERMEASURES panel.

1. Determine the type of countermeasure needed. Change loadout if needed.
2. Click **FIRE** to open the cover, and click again to fire the countermeasure.
3. To select a different countermeasure or load an empty tube, click the name of the countermeasure. Continued clicks cycle through the available options. The tube number light flashes while the tube is reloaded. When the tube number light is continuously lit the tube is ready to fire.

### Tube Reload Procedure

Only internal torpedo tubes can be reloaded when underway.

- ⇒ If the weapon name display reads EMPTY, click to load a weapon. Repeated clicks cycle through available weapons.
- When the text color of the word EMPTY is grey, the weapon names do not cycle. Grey text means that the muzzle door for that tube is still

open. Click **M** to close the muzzle door and wait until the tube is no longer flooded, and then reload the tube. Remember that closing the muzzle door cuts the wire on torpedoes and UUVs and they can no longer be wire-guided.

- ⇒ To change the weapon loaded in a tube click the weapon name until the desired weapon name appears.
- The red interlock light to the left of the weapon name flashes until the weapon reload is complete.

✓ **Note:** The unload/load process takes approximately seventeen minutes. Loading an empty tube takes 9 minutes. If the **Weapon Quick Launch** option is selected in the *Options>Game* screen, the time it takes to unload then reload a tube is cut to forty seconds and loading an empty tube takes 20 seconds.

## TARGETING SEA CONTACTS

1. To assign a contact to a tube, select the desired Track ID from the Target Selection List or click a contact symbol on the Fire Control map to automatically select it in the list.
- To send a weapon down a specific line of bearing, select Snapshot from the Target Selection List.
2. Click the number of a tube containing a weapon appropriate for the target. The Track ID appears below the tube number indicating this contact is now assigned to this tube.
- See Fire Control Selection List above for instances that prevent a contact from being assigned to a tube.
3. Click **P** below a tube number to display the presets for the weapon. For information on all presets see *688(I) Stations/688(I) Fire Control Suite/688(I) Weapon Presets*.
- If your Fire Control Autocrew is on, he enters the presets for you.
- For a Snapshot, enter the desired LOB along with other desired presets.
4. When presets are entered click the Launch Panel icon and initiate the launch procedure for the desired tube. See *688(I) Stations/688(I) Fire Control Suite/688(I) Launch Panel/Basic Launch Procedure*.
5. Once a wire-guided torpedo is launched, click the **W** button to display its Wire Guide Controls.

### Torpedo Wire Guide Controls

Any interior torpedo tube can fire wire-guided torpedoes. Once a torpedo is fired, its symbol appears on the Fire Control map. When a wire-guidable torpedo enables, two red lines extend from the torpedo symbol indicating the weapon's search cone. Until a torpedo enables, it can be wire-guided.

⇒ Click **W** below the desired tube to wire guide the torpedo from that tube. The **W** is only selectable if the tube has fired a torpedo that can be wired guided.

**Heading:** Click the right facing arrow to increment the weapon's ordered heading. Click the left facing arrow to decrease the ordered heading.

**Enable:** Click to enable the weapon before it reaches the enable distance set in the *Run To Enable* preset and start the weapon in its search mode.

**Pre-Enable:** Click to return an enabled weapon to its pre-enabled state without shutting the weapon down entirely. If you want to wire guide a weapon that has already enabled and started its search, click this option. The red enable cone disappears. Once the weapon detects a contact and begins homing, it can no longer be pre-enabled. It can only be shutdown.

**Shutdown:** Click to shut down the weapon entirely. The weapon cannot be enabled again if this option is selected.

✓ **Note** A torpedo is searching as long as it is snaking or circling (as set in the presets). If the weapon heads on a straight path, it is homing.

## ATTACKING LAND TARGETS

The 688(I)s can carry Tomahawk Land Attack Missiles (TLAMs). To attack a land target from Fire Control, the latitude and longitude coordinates of the site must be fed into the fire control system and a series of waypoints defined for the missile to follow. The coordinates are usually defined in a tasking message.

1. Set Ownship depth to 150 ft or less and a speed of 6 knots or less. Do not fire the missile until this depth and speed has been achieved or the Missile will fail.)
2. In the Target Display select a tube containing a land attack missile. Click **P** to open the Preset Panel for the tube.
3. Click **DEFINE TARGET WAYPOINTS** then click the Fire Control map to place four weapon waypoints. The number next to the last waypoint indicates the tube number.
  - ⇒ Click a waypoint to enter exact coordinates in the Latitude and Longitude presets or click and drag the waypoint to the desired location. Watch the latitude and longitude readout in the lower left corner of the Fire Control map as you drag the waypoint to determine its current location.

- ❑ The outermost waypoint should be placed at the exact latitude and longitude of the target as specified in your orders.
- ❑ If a landfall waypoint is directed in your tasking make sure that one of the earlier waypoints is placed at that latitude and longitude.

4. Set the destruct range for the missile. This is the range at which the missile will self-destruct if it has not encountered a target.
5. Initiate the launch procedure for the tube in the Launch Panel.

**Note:** Land sites with Link Contact IDs can be targeted from the Nav screen using the Contact Menu's *Engage With* command.

## LAYING A MINEFIELD

Follow these steps to lay a minefield.

1. Check your tasking or determine the exact latitude and longitude for each mine to be placed.
2. Determine which tube will fire the mine destined for each specific location. From the Launch Panel, load the desired tubes with mines.
3. In the Target Display Panel select each tube individually and place a waypoint for that mine to follow. Click P then click DEFINE TARGET WAYPOINT and click the Fire Control map to place the waypoint.
4. Select the waypoint and drag it to the desired location using the lat/long readout at the bottom of the Fire Control map. You can also enter the desired latitude and longitude in the waypoint presets.

The waypoint presets appear below the Define Target Waypoint button in the preset panel as soon as the waypoint is placed on the map.

**Tip:** Once mines are loaded and presets are entered, you can fire the tube from the Nav Map using the Ownship or Orders Menus. Map Markers can be placed on the Nav Map indicating the mine location and a launch point for the mine designated for that location. Using this method you can better tell when to fire the tube. See *Navigation Station/2D Navigation Map/Nav Map Menu*.

5. After firing the mine, reload the tube with a new mine or weapon.

## DEPLOYING AND WIRE-GUIDING UUVs

Because a UUV is a sensor, not a weapon, it can be fired without being assigned a target in the Target Display.

1. Set Ownship speed to 4 knots or less. Do not launch the UUV until that speed has been achieved.
2. To launch a UUV to a depth other than Ownship depth, first select the tube containing the UUV in the Target Display and click P to display its presets.
3. Click the checkmark to deselect *Use OS Depth* and display the *Depth* preset. Click a digit to increment its value. Right-click to decrease the value.
4. Select the desired tube in the Launch Panel and initiate the launch procedure as for a torpedo.

- ❑ If a UUV is in a tube it can be launched from the Orders or Ownship Menus using the Fire Tube command without visiting the Fire Control Station. It will be launched at Ownship's depth.

### **Wire-Guiding UUV/ Enabling Active Sonar**

1. From the Target Display select **W** below the tube that fired the UUV to display the wire-guide controls.
2. Click the Ordered Course arrows to adjust the course of the UUV.
- ❑ Passive sonar mode is on by default when a UUV is launched but active sonar mode can be enabled at any time as long as the wire is still attached and the 30-minute battery is functioning. Be aware that capable ships and subs in the area can detect UUV active sonar. However, active sonar may be necessary when traversing a minefield. Follow these steps to enable UUV active sonar.
3. Click **ENABLE** to initiate active sonar.
4. Click **PRE-ENABLE** to de-activate active sonar and return to passive mode.

✓ **Note:** Closing the muzzle door after launching the UUV cuts the guidance wire. Once the wire is cut the UUV no longer sends sonar returns.

### **UUV Returns**

Sonar returns from the UUV are automatically assigned a Track ID and can be found in the TMA Selected Track drop-down list and on the Nav and Fire Control maps. UUV sonar returns do not show up on any of the screens of the Sonar Suite although the UUV itself displays as a contact in Broadband and Narrowband Sonar. Depending on its course, the UUV may provide returns on Ownship.

- ❑ A contact detected by a UUV in passive mode appears on the Nav Map as a yellow *Unknown* symbol at the end of a white line of bearing that extends from the location of the UUV at a default range of 10 nm.
- ❑ A contact detected by a UUV in active mode appears as a yellow *Unknown* symbol at the end of a green line of bearing. The length of the LOB indicates the range of the contact from the UUV.

✓ **Note:** UUVs cannot be retrieved. Once the battery is expended you need only close the muzzle door to cut the wire and jettison the UUV. The tube can then be re-loaded. Altering Ownship's course by more than 90° cuts the wire.

## **688(I) WEAPON INVENTORY STATION**

The Weapon Inventory Station simply displays the current type and number of weapons on board your sub. No interaction is possible. The total of available weapons is updated as weapons and countermeasures are dispensed.

## 688(I) TACTICAL WEAPONS

The 688(I) Class submarines carry weapons capable of targeting surface ships, submarines and land targets. For gameplay purposes the 688(I)s can also target helicopters and low-lying planes from the sail bridge with a shoulder mounted SAM launcher when surfaced. Available weapons are described briefly below.

**Mk 48 Torpedo ADCAP (Advanced Capability):** This weapon can be used against both surface and submarine targets and can be wire-guided. It has a maximum range of 27 nm, a maximum speed of 55 knots and a maximum depth of 2,394 feet.

**TLAM (Tomahawk Land Attack Missile):** The Tomahawk is the standard sub-launched strike weapon for use against land targets. It has a range of approximately 1400 nm. For successful launch of this weapon during gameplay, Ownship depth must not exceed 150 feet and speed must not exceed 6 knots.

### Gameplay Weapons:

**TASM (Tomahawk Antiship Missile):** For gameplay purposes TASMs are assigned to the Seawolf and 688(I) class submarines. In actuality, these weapons have been removed from the fleet and are being converted to Tomahawk Land Attack Missiles. The TASM has a warhead of 500 kg and a range of 250 nm. For successful launch of this missile during gameplay, Ownship depth must not exceed 150 feet and speed must not exceed 6 knots.

**Harpoon: (Anti-Ship Missile):** While the Seawolf and 688(I) class subs no longer carry Harpoons, they maintain the ability to launch them. They are available in the loadout screen but they are not loaded by default. The Harpoon has a range of 70 nm For successful launch of this missile during gameplay, Ownship depth must not exceed 150 feet and speed must not exceed 6 knots.

## 688(I) STRATEGIC WEAPONS

### Mines:

**Mk 67 SLMM:** The submarine-launched mobile mine is a modified Mk 37 torpedo whose warhead was replaced by a Mk 13 mine warhead. The torpedo's propulsion system is used to maneuver the mine to the coordinates programmed into its guidance system. The SLMM has a 235 kg warhead, a maximum speed of 26 knots and a maximum range of 11.5 nm

## 688(I) COUNTERMEASURES

Countermeasures are defensive weapons used to prevent an enemy's torpedo from destroying your sub. The 688(I) carries Active and Passive torpedo decoys that can be launched from Fire Control Launch Panel, or via the Ownship or Orders Menus' *Countermeasures* option.

**Passive Decoy:** Used against passive homing torpedoes, this decoy emits sound (noise) across a broad spectrum of frequencies in an attempt to deceive the torpedo into homing in on the decoy.

**Active Decoy:** Used against active homing torpedoes this decoy is a bubble generator that creates an area of bubbles in an attempt to provide a false echo to the torpedo.

**Decoy Depth:** Decoys fired from the Fire Control Launch Panel are launched at Ownship Depth. Countermeasures fired via the Ownship or Orders Menus' *Countermeasures* option can be set to either a Shallow (100 feet) or Deep (800 feet) depth.

## 688(I) PRESETS

With the exception of countermeasures, everything that can be launched from the Fire Control Station has at least one preset. Presets are instructions that tell the weapon or UUV what to do. All presets are presented here alphabetically by type.

⇒ Click or right-click on the digits to increase or decrease the value.

### Antiship Missile Presets

#### Harpoon and TASM

**Destruct Range:** Sets the range at which the missile self-destructs if a target is not encountered. Use this to avoid hitting neutral and friendly ships in the area.

**Seeker Range:** Sets the range at which the missile begins search.

**Seeker Pattern:** Sets the area to be searched to either a wide or narrow pattern. Click the Wide/Narrow button to toggle the selection. This can be used to help discriminate against other shipping in congested waters.

✓ **Note:** Your ship must be at 150 feet or less and at 6 knots or less to successfully launch one of these antiship weapons.

### Land Attack Missile Presets

#### TLAM

**Define Target Waypoints:** Click DEFINE TARGET WAYPOINTS then click the Fire Control map to place four waypoints for the weapon to follow.

**Latitude/Longitude:** Click a waypoint to display presets for setting the precise Latitude and Longitude for the waypoint. Click/right-click the preset digits to set a specific value or click a waypoint and drag it to the desired location. Watch the Latitude/Longitude readout in the lower left of the Fire Control map when dragging a waypoint to determine the waypoint's current location.

**Destruct Range (nm):** Sets the range at which the missile self-destructs if a target is not encountered. Use this to avoid hitting neutral and friendly ships in the area.

- ✓ **Note:** Your ship must be at 150 feet or less and at 6 knots or less to successfully launch one of these Land Attack Missiles.

## Mine Presets

### SLMM

**Define Target Waypoints:** Click DEFINE TARGET WAYPOINTS then click the Fire Control map to place a single waypoint.

**Latitude/Longitude:** Click the waypoint to display presets for setting the precise latitude and longitude for the waypoint. These coordinates define the final destination of the mine. Click the digits in the preset panel to set the desired value or click a waypoint and drag it to the desired location. Watch the Latitude/Longitude readout in the lower left of the Fire Control map when dragging a waypoint to determine the waypoint's current location.

## Torpedo Presets

### Mk 48 ADCAP

**Snapshot Bearing (deg):** The weapon is fired on the bearing entered here. (This preset only appears if Snapshot is assigned to the tube from the Target drop-down list.)

**Depth:** Set the depth at which the weapon travels.

**Ceiling:** Set the depth above which the weapon does not travel.

**Floor:** Set the depth below which the weapon does not travel.

**Acoustics:** Click to choose Active or Passive sonar mode.

**Run To Enable (yds):** Set the distance (in yards) the weapon travels before it enables and starts its active search. Enabling the weapon too soon can alert the target in time to take evasive measures. Enabling too late can mean the weapon runs past the target.

**Speed:** Set the speed at which the weapon travels before it acquires a target.

## UUV Presets

**Use OS Depth:** Set the depth at which the UUV travels to that of Ownship. Use OS Depth is selected by default. Deselect the option to display the Depth option.

**Depth:** Enter the desired depth for the UUV to travel. Click a digit to increment the value. Right-click to decrease the value.

## 688(I) TMA STATION [F7]

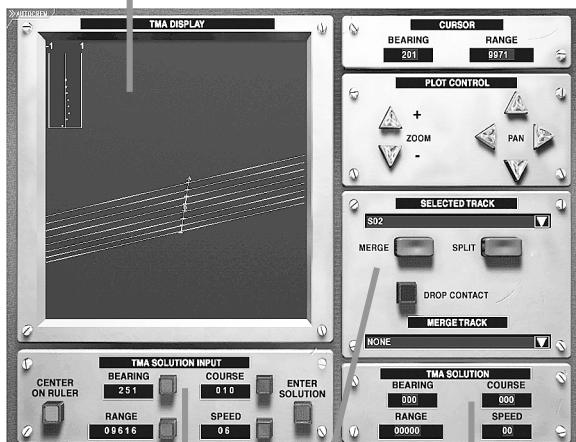
At the Target Motion Analysis (TMA) station, data from the 688(I)'s sensors are used to determine a contact's bearing, range, course and speed. This information, called a target solution or simply a solution, is necessary to accurately target a contact with your ship's weapons.

Performing TMA is not easy and without at least a rudimentary understanding of TMA functionality it is highly unlikely that TMA can be performed successfully. Since the FFG and all submarine classes in S.C.S. - *Dangerous Waters* have a TMA station, the TMA basics are described just once in this manual. See *Training/TMA Basics* for information on how to perform target motion analysis. Refer back to that section while learning to perform target motion analysis at the 688(I)'s TMA station.

## 688(I) TMA STATION COMPONENTS

The 688(I)'s TMA station is composed of several distinct areas: The TMA Display, the view controls and readouts, the track selection area, trial solution input area and the solution area. These areas are described briefly below. See *Training/TMA Basics* for additional information about these areas.

TMA Display



Trial Solution Input Area      Track Selection Area      Solution Area

### 688(I) TMA Display

The TMA Display presents a representation of Ownship, a history of bearing data for a selected contact, a TMA ruler and an error dot stack. These tools are used to analyze sensor inputs.

#### Bearing Lines (LOBs)

When a sensor sends a bearing report to the TMA a history of each report is maintained. When a contact is selected the bearing report history for that contact appears on the TMA board. The lines extend indefinitely for

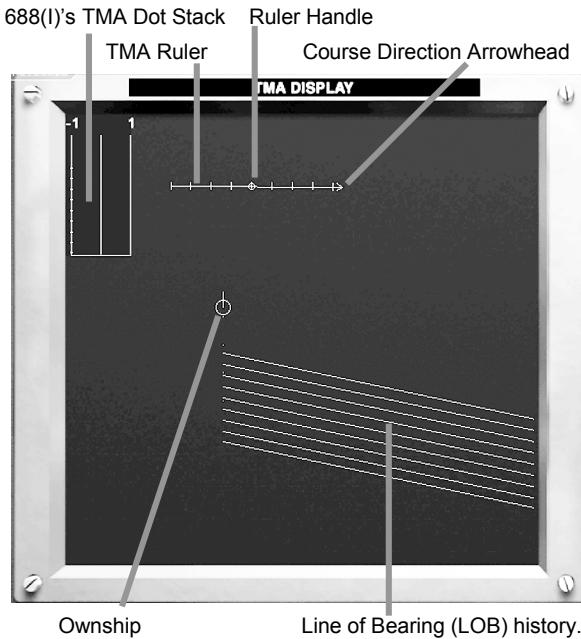
contacts reported by sensors that report only a bearing. The ruler is found at the default range of 10,000 yards.

The ruler is found at the end of the LOB (the reported range) when it is reported by active sonar, radar or the stadiometer. The color of the bearing lines indicates the sensor that is detecting it.

<b>Spherical (bow) array:</b>	White
<b>Conformal (hull) array:</b>	Blue
<b>Towed array:</b>	Purple
<b>Active sonar:</b>	Green
<b>Active Intercept:</b>	Yellow
<b>Periscope or ESM:</b>	Red
<b>Radar:</b>	Yellow
<b>UUV passive sonar:</b>	White
<b>UUV active sonar:</b>	Green

#### **Time History Right-Click Menu**

Right-click the TMA Display to change the bearing history on the TMA Display. As long as a tracker is tracking, bearing information is sent to TMA in two-minute intervals. If the screen gets too cluttered, change the number of lines that are displayed. History options available are 10 minutes, 20 minutes (default), 1 hour and 4 hours. A check mark indicates the selected option.



### The TMA Ruler

The TMA ruler is used to generate your best estimate of the contact's course and speed. Its location on the board relative to Ownship indicates your estimate of the range of the contact. With each new bearing line an additional tick mark is added to the ruler and another dot is added to the top of the dot stack.

The ruler components are described below.

- The arrowhead on the ruler indicates the *course* of the contact.
- The length of the ruler represents the current estimate of the contact's *speed*: the longer the ruler, the faster the estimated speed.
- The distance of the ruler from the Ownship marker represents the contact's estimated *range*.
- Each tick mark represents a specific interval of time. (Towed and Bow arrays update every two minutes while radar and continuous active sonar update with every sweep or ping.) The mark at the end of the ruler represents the initial or oldest information.
- The *estimated current bearing* of the contact is a point just ahead of the arrowhead. The *last reported bearing* is represented by the tick mark closest to the arrowhead.

**Note:** All of the current estimates represented by the ruler appear in numerical form in the Solution Input Area under the TMA Display.

## Manipulating the Speed Strip Ruler

The speed strip ruler is adjusted as follows.

**Adjusting length and direction:** Click and drag the end mark or the arrowhead to adjust the length or direction of the ruler.

**Positioning Tick marks:** The tick mark closest to the arrowhead should be placed on the most recent bearing line. The end tick mark should be positioned on the initial or oldest bearing line.

**Using the Handle:** A circle appears at the center of the ruler when more than one tick is present and speed is more than zero. The circle acts as a handle. Click the handle and drag the entire ruler to another location. The handle maintains the current course and speed settings of the ruler and adjusts range and bearing.

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**S.C.S. - Dangerous Waters Tip:** Center on the ruler and zoom in to better manipulate the ruler and access the handle. If you have difficulty dragging the ruler to get the arrowhead pointed in the desired direction, enter the desired course number in the course field. You can also press [SHIFT] and click and drag the TMA Display where you want to place the end of the ruler or press [SHIFT] and right-click and drag to place the arrowhead.

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## The Dot Stack

The dot stack in the upper left corner is a graphical representation of the error between tick marks and bearing lines. The dot at the top of the stack is associated with the most recent bearing line. Moving the ruler and adjusting the location of the tick marks allows you to line up the dots along the center vertical line in the dot stack. The analysis is probably most nearly correct when the top most dots are on the centerline. This process is called stacking the dots.

## 688(I) Cursor Readouts and Plot Control Area

The upper right area of the TMA station contains the plot controls that adjust the view in the TMA Display. The Cursor readouts give the bearing and range at the cursor location whenever the cursor is in the TMA Display. Click the PAN and ZOOM controls as needed to adjust the view. In addition to the zoom control the following keyboard and mouse commands are useful for adjusting the view:

- ⇒ Press [CTRL] + click to zoom out. Press [CTRL] + Right-click to zoom in.
- ⇒ Roll the mouse wheel forward to zoom in, backward to zoom out.
- ⇒ Click the CENTER ON RULER button below the TMA Display before zooming in for the clearest view.

## 688(I) Track Selection Area

The area at the center right of the 688(I)'s TMA station is used to select a contact to analyze, merge, split or drop.

**SELECTED TRACK** drop-down list: This dropdown lists the alphanumeric Track IDs for designated (marked) contacts. Select a Track ID from the list to display the available history of bearing lines for that contact. The first letter of the contact designation represents the source of the data: S for Sonar, R for Radar, V for visual (Periscope and Stadiometer), and E for ESM.

**MERGE:** Click to merge the contact in the SELECTED TRACK drop-down list with the contact selected in the MERGE TRACK drop-down list. This is useful when the same contact is reported by more than one sensor.

**SPLIT:** Click to split the merged (M) contact selected in the SELECTED TRACK drop-down list into its two original contact components.

**DROP CONTACT:** Click to permanently drop the contact selected in the SELECTED TRACK dropdown list.

**MERGE TRACK:** This dropdown lists all contacts except the contact selected in the SELECTED TRACK drop-down list.

## 688(I) Solution Input Area

The area below the TMA Display is used to create and fine-tune a firing solution for the selected contact. From this area the solution is entered into the ship's fire control system.

**BEARING, COURSE, RANGE, and SPEED Fields:** Represent the trial solution for the selected contact. The current position and size of the TMA ruler is reflected in these fields. These numbers are altered by dragging and resizing the ruler or by entering values directly into these fields. The ruler moves to reflect the entered values.

**Lock Buttons:** Click the button to the right of each field to lock the value in that field. The ruler reflects the locked value. A depressed, illuminated button indicates a locked value. (If a value is locked for one contact it is locked for all. Unlock the field when analyzing other contacts.)

**ENTER SOLUTION:** Enters the values in the trial solution fields into the system. These values are now the system firing solution for this target. The NTDS symbol for this contact is located on the Nav and Fire Control maps at the designated bearing and range and moves on the course and speed entered here.

- ✓ **Note:** The ruler position for selected contact A is not retained when you select Contact B unless a solution has been entered for Contact A prior to selecting another contact. That means that unless you enter your solution, the ruler you have carefully positioned on contact A will be in a different position when Contact A is reselected. Don't lose your work. Enter your solution. You can always fine-tune it later.

## **TMA Solution Area**

The TMA SOLUTION area in the lower right of the station displays the current solution in use by the Fire Control system for the selected contact. There is no user interaction in the TMA SOLUTION area. These fields display zeros until you have clicked ENTER SOLUTION in the TMA Solution Input Area.

- ⇒ To change the solution in use by the system for the selected contact, alter the ruler to the desired position on the TMA Display or enter numbers directly into the trial solution area fields, then click the ENTER SOLUTION button again.

## **TMA ON RADAR, ACTIVE SONAR, VISUAL CONTACTS**

Contacts marked with active sonar, radar and the Stadiometer appear as a bearing/range pair on the TMA Display. The bearing line ends with a tiny triangle positioned at the range of the contact. If the target's bearing and range are known at two different times, as is the case with active sonar and radar, the solution can be found by connecting dots and 'drawing a line' with the ruler for course and speed.

A UUV in active mode provides returns from the location of the UUV in TMA and on the Nav and Fire Control maps.

- ✓ **Note:** Marking a contact with the periscope does not provide an automatic range. But using the Stadiometer to manipulate a photo of the visual contact can provide you with a range that is fairly accurate. See *688(I) Stations/Periscope-Stadiometer Stations/688(I)Stadiometer Station*. When visual or periscope contacts are referred to in this section, it is assumed that you have determined a range for the contact and marked it in the Stadiometer Station. The Periscope and Stadiometer Stations work hand in glove.

### **To determine a target solution for Active Sonar, Periscope or Radar Contacts:**

1. Select a Track ID from the SELECTED TRACK dropdown list
- Radar contacts have an R designation, visual contacts have a V designation, and active sonar contacts have an S designation the same as passive sonar contacts.
- A bearing line appears on the TMA Display. A tiny triangle at the end of the bearing line indicates the target's range at time the contact was marked.

2. After a short interval return to the active sonar or radar station (whichever you are using) and mark the contact again. (When ON Radar Autocrew automatically marks contacts as long as the Radar is radiating.)
  - ⇒ For visual contacts, take another photo of the contact from the periscope and manipulate it in Stadiometer, then mark the contact again from the Stadiometer Station.

- ⇒ Continue to mark the contact at two-minute intervals to accumulate several bearing lines. Toggle back and forth between the TMA and your chosen sensor.

3. Adjust the view on the TMA Display to get a clear view of the ruler and the range triangle.
  - ⇒ Move the ruler to the location of the range triangle, click the red button at the center of the display control arrows to center the ruler in the TMA Display, and then click the zoom buttons to better adjust the view. If you lose site of the ruler, zoom all the way out or click the red center on ruler button again.
4. Drag the arrowhead or tail of the ruler to adjust the tick marks along the bearing lines until the dots line up in the dot stack indicating a good solution.
5. Click the ENTER SOLUTION button to send the trial solution to the Fire Control system.

## **TMA ON PASSIVE SONAR AND ESM CONTACTS**

Determining a plausible solution is more complex when only a bearing is known, as is the case with passive sonar and ESM contacts. It takes more time and changes to Ownship course may be necessary to determine an accurate solution.

Passive sonar contacts with assigned trackers are updated automatically on the TMA Display. ESM contacts must be updated manually by repeatedly marking the contact at the ESM Station. Contacts detected by a UUV in passive sonar mode are displayed on a LOB from the location of the UUV on the TMA Display and in the Nav and Fire Control maps.

### **To perform TMA on passive sonar contacts:**

1. Select a Contact ID from the SELECTED TRACK dropdown list. A line of bearing appears on the TMA Display. The ruler appears at the default range of 10,000 yards on the most recent LOB with the arrowhead facing Ownship (or the UUV sensor if it is a UUV contact) with a default speed of 10. These default values appear in the trial solution fields directly to the right of the TMA Display.

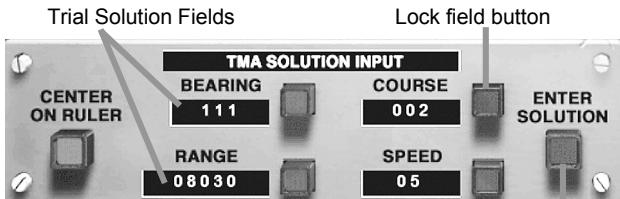
✓ **Note:** No contacts appear in the drop-down lists if no contacts have been designated. Link contacts never appear in the TMA track list.

2. Adjust the ruler position to estimate the contact solution.
  - ⇒ Position the end tick of the ruler on the oldest bearing line. (The end tick is on the oldest bearing line when the bottom dot is on the centerline of the dot stack.)
  - ⇒ Click CENTER ON RULER then click the zoom buttons to better adjust the view.
  - ⇒ If you lose site of the ruler, zoom all the way out or click CENTER ON RULER button again.

- ✓ **Note:** The circular ruler handle is only visible when the ruler contains more than one tick mark or a speed of greater than 1 knot (kt) is set in the Speed field in the trial solution area. You must zoom way in on the ruler to see it at that speed. You also can set temporarily the speed to 10 knots or more in the Speed field. This expands the ruler and reveals the handle.

3. Enter any known data in the trial solution fields.

- ❑ If you have additional data on the contact's range, or course, for example from an intelligence message, enter it in the appropriate solution field. If you have determined the contact's speed using DEMON, enter that speed in the speed field. See 688(l) *Stations/688(l) Sonar Suite/688(l) DEMON Sonar Station*. Click the digits to cycle through the values.
- ❑ If you are sure about one aspect of the solution (e.g. range) enter that value directly into the Range field then lock the field. That keeps you from dragging the ruler to a different range.
  - ⇒ To lock a field, click the red button associated with the field. Lock buttons are located to the right of each trial solution label. These buttons are lit when the field is locked.



Click to enter the solution into the ship's fire control system

4. Adjust the ruler on the display until the tick marks align well with the contact bearing lines and the dots appear to line up along the centerline off the dot stack.
  - ⇒ Click the handle in the middle of the ruler to drag the entire ruler.
  - ⇒ Click and drag on either end of the ruler to move just that end or to adjust the length of the ruler.
5. When a good match between the tick marks, the bearing lines and the dot stack has been achieved, click ENTER SOLUTION to send this information to the Fire Control system. The system tracks the estimated position of the contact based on this system solution and uses that estimated location when targeting the contact.

- ❑ The entered system solution displays in the TMA SOLUTION panel at the lower right of the TMA station. To update the contact's system solution, adjust the ruler or directly input information in the trial solution fields and click ENTER SOLUTION again.

6. Changing Ownship's course and/or speed can refine the TMA solution. After steadyng on the new course and/or speed, adjust the ruler to achieve the best fit.

If one TMA solution does not fit the entire observed bearing data, consider the fact that the contact itself may have changed course and/or speed (a contact "zig"). Attempt to achieve a better fit of the ruler by disregarding some of the earlier bearing lines and looking only at recent bearings.

### **Merging, Splitting and Dropping Contacts**

If the same contact is tracked by more than one sensor (e.g., a contact tracked by passive sonar and radar), the data can be merged into a "master" contact. (Master contacts have alphanumeric designations that begin with the letter M.) This can be very useful if you have a good range from one sensor (radar or active sonar) and a good bearing history from another (passive sonar).

1. Click the SELECTED TRACK drop-down and select one of the contacts to be merged.
2. From the MERGE TRACK drop-down select the track to be merged with the contact selected in the SELECTED TRACK drop-down list.
3. Click the MERGE button.
  - ⇒ To undo a merge, select the master contact (e.g. M01) from the SELECTED TRACK dropdown and click the SPLIT button.
  - ⇒ To drop the selected contact altogether, click the DROP button. Dropping a contact cannot be undone.

✓ **Note:** If the TMA Autocrew is activated, he does everything for you. You can make no TMA inputs yourself. For more information on your TMA Autocrew see 688(I) *Stations/688(I) Autocrew*.

### **TMA ON UUV SENSOR CONTACTS**

In S.C.S. - *Dangerous Waters* all controllable submarines can carry Unmanned Underwater Vehicles (UUVs). These UUVs have sonar capabilities only and cannot launch weapons. For information on launching UUVs see 688(I) *Stations/688(I) Fire Control Suite/Deploying and Wire-Guiding UUVs*.

The lines of bearing for contacts detected by a UUV are drawn from the location of the UUV at the time of the report, not from Ownship's location. TMA on UUV contacts is performed as for any other sonar contact in active or passive mode.

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## **688(I) PERISCOPE /STADIUMETER STATIONS [F8]**

The 688(I) Periscope Station in S.C.S. - *Dangerous Waters* merges the functionality of the Periscope with that of the Stadimeter and also provides

access to the Ice Thickness display useful for navigating ice fields and surfacing under the ice.

The Stadiometer is only accessible from the Periscope Station.

- ⇒ Click the Stadiometer icon button to the lower right of periscope view to enter the Stadiometer station
- ⇒ Click ice button at the lower left of the periscope view to move to the Ice Thickness display.

Raise and Lower Periscope Mast



## DETECTING CONTACTS WITH THE PERISCOPE

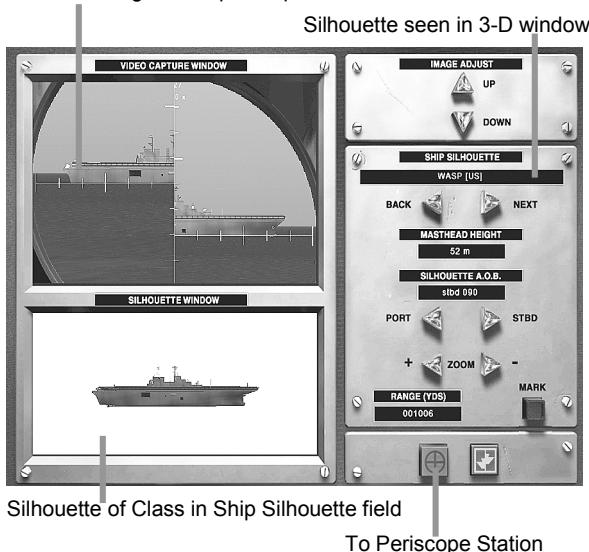
1. Ensure the ship is at **periscope depth (63 feet)** and at a speed of 10 knots or less if the sail is submerged. (Sea state affects periscope depth. If the seas are rough you may have to go shallower.)
2. Click RAISE to raise the periscope mast.
3. Rotate the periscope to look for contacts. Click the PAN arrows on the left-side periscope handle, or click and drag in the periscope view to rotate the periscope view 360°.
4. Make use of the periscope's ESM sensor as you rotate the scope. This sensor can alert you to the presence of a contact before you can see it in the periscope view. The ESM indicator lights illuminate from the bottom up when a radar emitter is detected. (Green indicates a weak signal, red a strong one.)
5. Zoom and adjust the view. Center the view on the contact of interest. Zoom in and adjust the elevation as needed.
  - ⇒ Click the ZOOM and ELEV buttons as needed.

- With a contact centered in the periscope reticule click MARK to assign it an alphanumeric designation and send the bearing information for the visual sighting to the Target Motion Analysis station and the Nav Map. Visual contacts have a V designation. (V01, V02 etc.) When marked by the periscope the contact symbol appears on a line of bearing at a default distance.
- Center the contact in the middle of the periscope view. Align the horizontal line with the waterline before you take the picture. Click the PHOTO button to send a photo of the contact to the Stadimeter.

## 688(I) STADIMETER STATION

The Stadimeter Station is accessible only from the Periscope station by clicking the Stadimeter icon button. The Stadimeter is used to manipulate a photo of a contact taken through the periscope to determine the contact's **range, course and class**.

Click and drag to manipulate photo



### Determining Course with the Stadimeter

Follow these steps to determine the approximate course of the contact.

- Take a photo of a contact in the Periscope Station [F8].
- Click the Stadimeter icon button to switch to the Stadimeter Station.
- When the Stadimeter Station appears, the last photo taken through the periscope appears in the VIDEO CAPTURE WINDOW.
- In the SHIP SILHOUETTE field the ship's computer provides the names of all ship classes and weapons in the game. Click the BACK or NEXT arrow buttons below the SHIP SILHOUETTE field to cycle

through the names in the SHIP CLASSIFICATION window to display the 3D silhouette for each available class in the SILHOUETTE WINDOW. When a match is determined, leave the selected name in the SHIP SILHOUETTE field.

4. Click the ZOOM arrows to match the size of the 3D silhouette with that of the photographed contact.
5. Rotate the silhouette by clicking the PORT and STBD (Starboard) arrow buttons to closely match the aspect of the ship in the photo to help match the silhouette to the photo. Matching the aspect provides the Angle on the Bow (AOB) needed to determine a close approximation of the contact's course. Course is a piece of information needed in developing a firing solution in TMA.
6. Determine the reciprocal of the bearing to the contact shown in the Bearing readout. (If the value in the bearing readout is 0 to 180, **add** 180. If the value in the Bearing readout is 180 to 360 **subtract** 180.)
7. If the contact has a **port** aspect, **add** the number in the AOB window to the reciprocal. If the contact has a **starboard** aspect, **subtract** the number in the AOB window from the reciprocal.
8. If the resulting number is **greater** than zero and **less** than 360, this number is a good approximation of the course of the contact.
  - If the number is **greater** than 360, **subtract** 360. The resulting number is a good approximation of the contact's course.
  - If the number is **less** than zero, **add** 360 to it. The resulting number is a good approximation of the contact's course. Enter that number in the Course field in TMA when this contact is selected.

### **Determining Class/Range with the Stadimeter**

1. Under the SHIP SILHOUETTE field click the right and left facing BACK and NEXT arrows to cycle through the class and weapon names in the SHIP SILHOUETTE window to display the 3D silhouette for each available class in the SILHOUETTE WINDOW.
2. Rotate the silhouette model by clicking the PORT and STRB arrows. Click the Zoom buttons to alter the size of the silhouette in the window. When a match is determined, leave the selected name in the SHIP SILHOUETTE field.
3. Click the side of the photo containing the contact's highest mast and drag that side of the photo such that the top of the highest mast is even with the waterline on the other half of the photo or use the UP and DOWN arrows in the IMAGE ADJUST panel; to manipulate the photo. The estimated range to the ship is displayed in the Range readout.
4. Click MARK. This sends the contact's bearing and range to TMA and the Nav Map.

- The class name showing in the Stadimeter SHIP SILHOUETTE field when the contact is marked is assigned to the contact.

- ✓ **Note:** The photo must be manipulated to determine a range when the contact is marked or no contact is created on the Nav Map or TMA.

5. Click the Periscope icon button to return to the Periscope Station view.

## 688(I): ICE THICKNESS DISPLAY [F8]

The 688(I)'s Ice Thickness Display is only accessible from the Periscope Station.

- ⇒ Click the Ice Keel Icon Button below the Periscope view to access the display. Click the Periscope reticule to return to the Periscope station.

The 688(I) utilizes an upward looking television camera to assist in locating suitable locations for surfacing when under the ice. Suitable areas appear brighter while areas where the ice is very thick appear dark. Because the TV relies on differences in brightness it is not helpful at night. The Signal Strength Indicator uses colored lights to indicate the thickness of ice directly over Ownship as follows.

### **Signal Strength Indicator Lights**

Ownship cannot penetrate ice with a thickness greater than 10 feet. The lights in the Signal Strength Indicator represent the following ice depths and damage expectations.

**Green:** 0-4 feet thick; no Damage to Ownship.

**Yellow:** 4-8 feet thick; minor damage, may lose ice sensors.

**Red:** 8-10 feet or more; moderate to serious damage; may lose masts, flooding possible.

### **To Surface and Submerge Under the Ice**

Use the following procedure for surfacing and submerging under the ice

1. Use your ship's Ice Thickness display to locate a polynya in the ice as described above.
2. At a slow speed (1 – 2 knots) position the sub under the polynya then bring the sub to a complete stop.
3. From the Task Bar's Orders Menu select *Navigate>Set Depth>Surface* or set your depth at the 688(I)'s surfaced depth of 32 feet.

- You can tell that the ship has surfaced by selecting Ownship and looking in 3D view. The ship's sail emerges through the ice.
- For those who prefer not to use the 3D view, check the depth readout to determine that you have achieved surfaced depth.
- Once surfaced you can raise the periscope and view the ice field. Be sure to lower your periscope again before submerging to avoid damaging it.

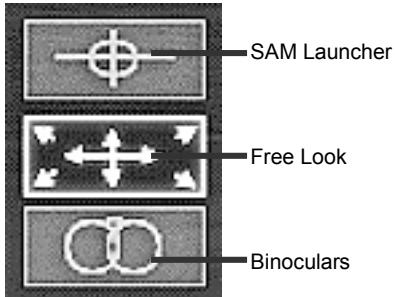
4. To submerge the ship again, maintain a speed of zero and order a depth well below the thickness of the ice. Be sure to first retract any masts you may have raised!

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## 688(I) SAIL BRIDGE (SAM LAUNCHER) [F9]

The Sail Bridge station is only accessible when the submarine is surfaced. The Sail Bridge provides three views: Free Look, Shoulder Mounted SAM Launcher and Binoculars.

⇒ Click the desired icon button to switch to that mode.



**Free Look:** The default view in the Sail Bridge provides a 360° naked-eye view of the area. Click and drag to pan the view.

**Binoculars:** Zoom from 2X to 16X by clicking the right side of the thumb wheel at the top of the screen. Click the left side to decrease zoom. Click and drag to pan the view. VISUAL mode is selected by default. LLTV mode is available for night vision.

**SAM Launcher:** The 688(I)s in S.C.S. - *Dangerous Waters* carry FIM-92 Stinger Surface-to-Air Missiles. A shoulder mounted SAM launcher is modeled and can be used to attack helicopters and low flying airplanes. The SAM launcher view provides a first-person shooter aspect to engage aircraft within range:

FIM-92 Stinger: Range: 4.3 nm (8,000 meters)

### LAUNCHING A SURFACE TO AIR MISSILE (SAM)

1. Surface the ship.
2. Press [F9] to access the Sail Bridge. This button is not enabled until the ship is on the surface or the sail is mostly exposed.
3. Click the SAM Launcher icon button.
4. Click and drag in the view to position the reticule on the target.
5. The interior Target Indicator bars turns red when there is a valid target centered in the reticule. Right-click to fire the weapon. It automatically reloads.

✓ **Note:** If you submerge the ship or heavy seas submerge the sail for long periods of time, the view moves to the Nav Map. The Sail Bridge is not accessible until the ship resurfaces.

## 688(I) AUTOCREW

The 688(I) has five Autocrew available to assist with both the mundane and the difficult aspects of gameplay. The 688(I)'s Autocrew functions are explained below.

### 688(I) BROADBAND/NARROWBAND SONAR AUTOCREW

When ON, the Broadband/Narrowband Sonar Autocrew searches Narrowband for contacts. Because they share trackers, contacts marked in Narrowband also display in Broadband. Autocrew also assigns trackers, classifies all marked contacts in Narrowband and assigns a Low, Medium, or High level of confidence in his classification. The level of confidence displays in the Navigation Station's DDI and above the 3D model when that contact is selected.

**Low level of Confidence:** Crewman has narrowed the possible classes to 4 or more and picks one at random

**Medium Level of Confidence:** Crewman has narrowed the possible classes to 2 or 3 and picks one at random

**High Level of Confidence:** Crewman has narrowed the possible classes to one

When this Autocrew is ON you can still mark contacts yourself and select different arrays and contacts for the crewman to analyze.

- ❑ **On the Nav Map:** Each contact marked by your Sonar Autocrew appears on the Nav Map as a colored line of bearing ending with a symbol. This is usually the symbol for Unknown (platform category)/Unknown (ID (alliance)) and is accompanied by its Contact ID number (S01, S02, etc). As soon as your Sonar Autocrew has classified the contact, the symbol changes to that of the specified class. Clicking on the Contact displays information about the class in the DDI and the 3D model of that class appears in the 3D view surrounded by a bounding yellow bounding box and a level of confidence bar.
- ❑ **Your task:** Your Sonar Autocrew can classify a contact as a specific class, but he cannot determine its alliance (ID). You must do that yourself on the Nav Map.
  - ⇒ On the Nav Map, click the contact to select it then right-click on the contact's symbol to display the Contact Menu.
  - ⇒ Select *Designate Category/ID>ID* and select the presumed alliance ID for the contact.

## 688(I) SONAR ACTIVE INTERCEPT AUTOCREW

When ON this Autocrew marks all contacts detected in Active Intercept. You have no additional responsibilities in this station when Active Intercept Autocrew is on.

## RADAR AUTOCREW

You must raise and lower the radar mast. When ON, your Radar Autocrew performs the following task as long as the radar is on:

- Marks contacts and re-marks them every minute that the contact can be detected. Contact range and bearing is sent to TMA and is reported on the Nav screen DDI when that contact is selected.

✓ **Note:** The Radar Autocrew is not speedy. It takes a minute or two before he begins to mark contacts. When Radar Autocrew is ON, you cannot move the Radar cursor.

## 688(I) FIRE CONTROL AUTOCREW

When ON, the Fire Control Autocrew performs the following duties:

- Uses information sent from the TMA station to establish presets for the selected weapon that are appropriate for the assigned target.
- Your Task:** It is still your responsibility to select a target, assign a tube, and fire the weapon from the Fire Control Launch Panel or by using the Contact Menu's *Engage With* command from the Nav Station. Your Fire Control Autocrew uses the contact's classification when determining presets. If you classify a contact as a surface ship when in actuality it is a submarine, your Autocrew enters presets appropriate for a surface ship.
  - ⇒ Click the Autocrew slider button at the upper left of the Target Display to toggle the state of the Fire Control Autocrew. The Autocrew is ON when the crew silhouette is visible.

✓ **Note:** When the Fire Control Autocrew is ON you can set only Snapshot bearings and place waypoints in the presets. All other presets are greyed out.

## 688(I) TMA AUTOCREW

Accurate TMA takes time. Your TMA Auto Crewman requires data from several sensors and/or a change in Ownship's course to generate an accurate firing solution.

- ⇒ Click the AUTOCREW slider button in the upper left corner of the TMA station to toggle the state of the TMA Autocrew. Autocrew is ON when the silhouette is visible.

When ON, the TMA Autocrew:

- Uses information reported from all sensors to determine a firing solution. This solution is his best estimate of the course, bearing, range and speed of a contact.
- Merges contacts that represent the same track reported by different sensors.
- Keeps track of the movement of each contact and updates the solution on the Nav and Fire Control Maps with every new sensor input. The solution is updated immediately with his best guess whenever a contact is selected from the drop-down list in the TMA station.
- Once the crewman enters a solution for a contact, the contact then appears as a symbol on the Nav Map at the designated range and bearing and the solution is also sent to Fire Control for use in targeting. The symbol for Unknown displays until you or the Sonar Autocrew classifies it.
- The Nav Map symbol for the contact moves on the map according to the course and speed set in the solution.

✓ **Note:** When TMA Autocrew is ON, you can select specific contacts to view on the TMA board, but you are not able to manipulate the ruler or the settings.

# *APPENDICES*



## APPENDIX A: ACRONYMS

Acronym	Complete Term	Additional Info
ADT	Air Detector Tracker	This button on the FFG's Weapons Coordinator Station toggles the state of the Air Search Radar.
ASTAC	ASW/ASUW Tactical Air Controller	
ASUW	Anti-surface Warfare (Helicopter role)	In an ASUW mission the helicopter provides 'eyes' and sensors that extend beyond the reach of the parent ship's sensors. When the helicopter has classified and localized the threat platform, data is sent via Link to the parent ship for a surface-to-surface prosecution. If the helicopter is equipped with appropriate weapons it can also engage the target.
ASW	Anti-Submarine Warfare	In an ASW mission a platform is tasked to classify, localize, and potentially attack a suspected threat detected by Ownship's sensors or by sources external to Ownship.
ASWO	Anti-Sub Warfare Officer	
ATF	Automatic Tag Follow	One of eight 'trackers' that can be assigned to broadband contacts (tags) in the FFG-7s Towed Array Station.

Acronym	Complete Term	Additional Info
ATO	Airborne Tactical Officer	The ATO is responsible for the tactical situation, deciding what assets will be used to prosecute the target and handling the coordination of other assets on scene.
ATT	Automated Target Tracker	The only tracker that can be assigned to an active sonar contact in the FFG-7s Active (Hull Sonar) Station. Once assigned it marks a new bearing and range with each return. Not available in the hull sonar's passive mode.
BT	Bathythermograph	Sonobuoy
CAS	Combined Antenna System	Used with FFG Gun and SM2 Missile in S.C.S.- <i>Dangerous Waters</i> .
CPA	Closest Point of Approach	
CWI	Continuous Wave Illumination	Used to guide missiles on the FFG.
CWIS	Close-In Weapons System	Used on the FFG.
DDI	Digital Data Indicator	
DDI	Data Display Indicator	Displays known or suspected information about a hooked platform
DICASS	Directional Command-Activated Sonobuoy	
DIFAR	Directional Frequency Analysis and Recording	
LOFAR	Low-Frequency Analysis and Recording	
NTDS	Naval Tactical Display System	
OTS Buoy	Over The Side	Sonobuoys launched by FFG

Acronym	Complete Term	Additional Info
REMRO	Remote Radar Operator	This button on the FFG Weapons Coordinator Station is available when the helo is aloft, SYNC is established and Incoming LINK data is set to RADAR in the ASTAC Station.
RPM	Revolutions Per Minute	
SDT	Surface Detector Tracker	This button on the FFG Weapons Coordinator Station toggles the state of the Surface Search Radar
SENSO	Sensor Operator	The SENSO is the person who operates the radar and magnetic anomaly detection (MAD) equipment, and processes returns from sonobuoys and the dipping sonar.
STIR	Separate Track Illumination Radar	Used to guide the FFG's SM2s in S.C.S. – <i>Dangerous Waters</i> .
VAB	Variable Action Button	
VLAD	Vertical Line Array Directional Frequency Analysis and Recording	



## APPENDIX B: TERMS

Term	Definition	Game Info
688(I)	Any controllable U.S. Improved Los Angeles class nuclear submarine.	
Akula	Any controllable Akula I Improved or Akula 2 nuclear submarine.	All Akula game interfaces are the same. Their weapons, top speed and noise levels differ.
Category	Refers to a type of a platform (e.g., surface, subsurface, airplane (air) and helicopter.)	Any Ownship contact that is not assigned a category cannot be targeted with a right click menu or from the Submarine Fire Control Stations. The system needs to know if a weapon is appropriate for the selected target before it will fire anything.
Cavitation	The sudden formation and collapse of low-pressure bubbles resulting from rotation of a the ship's propeller.	Cavitation is noisy and easily detected by sonar.
Confidence	This refers to how confident you are that your classification of a given contact is accurate.	Listed as Low, Medium or High This is user assigned for contacts detected by Ownship sensors and Link assigned for Link contacts. The designation appears graphically above the selected contact in 3D View and in the DDI at the Navigation Station.

Term	Definition	Game Info
Contact	Anything detected visually or by one of your ship's sensors. A contact is sometimes referred to as a Track.	
Controllable Platform	A ship, sub or aircraft that can be player controlled in the game.	
FFG-7 or FFG	Any controllable U.S. Oliver Hazard Perry (FFG-7) class platform.	
Geoplot	The round CRTs on the FFG used in ASTAC and other screens and the rectangular screens seen in the MH-60R that display NTDS symbols.	Symbols are not colored in the Geoplot as they are on the Nav Map and there is no map overlay. Click on a symbol to select (hook) it.
Gram	Any of the small, rectangular digital displays windows found in the FFG-7, MH-60R or P-3C platforms that display narrowband and SSP data from sonobuoys.	Generic term for Sonobuoy Data Display Windows and any data displayed therein regardless of data type.
Hook	To select a track symbol on the Nav Map or Geoplot screens.	Clicking on a track symbol "hooks" or selects it.
Ice Keel	Large chunks of ice that descend deep under the ice floe	Hitting an ice keel can damage the ship during under ice operations. Only the Seawolf, the 688(I) and Akula submarines have Under Ice capability in SCS—Dangerous Waters.

Term	Definition	Game Info
ID	When seen alone, this word refers to the presumed alliance of a contact (Friendly, Hostile, Neutral, Unknown etc.)	Contact ID or Track ID refers to the contact's track/ID number.
Kilo	Any controllable Kilo Project 877 or Kilo 636 (Russian or Chinese) nuclear submarine. All Kilo station interfaces are the same. Their weapons, top speed and noise levels differ.	
Link	A network of platforms (ships and aircraft) that provide position reports and sensor contact information via secure two-way UHF or HF radio transmissions.	Link is modeled for all any side that has controllable platforms regardless of country. (All Ownside A.I. platforms and other Ownside players in a Multiplayer game are members of the same Link regardless of country affiliation.)
Link Contact	A contact reported by a Link Participant	Contact symbols and Track IDs appear on the Nav Map and in Fire control Stations for Ownside platforms and any contacts they detect when Show Link Data is ON.
Link Participant	All Ownside platforms (and land bases) reporting in the Link.	NTDS Symbols for all Link participants appear when Show Link Data or Show Allies is on. Track numbers only appear when Show Link Data is ON.
Local Contact	A contact marked by Ownship.	

Term	Definition	Game Info
MH-60R or MH-60 or Helo	Any controllable U.S MH-60R helicopter. The FFG's embarked MH-60R helo is also referred to as helo even when it is not player controlled.	
Ownship	Refers to the current controllable platform regardless of category. (Controllable aircraft are referred to as Ownship.)	
Ownside	All platforms and land bases on your side.	All Ownside platforms are part of your Link and report to you their position to you as well as data on any contacts they hold.
P-3C or P-3	Any controllable U.S P-3C Orion Update III AIM airplane.	
Platform	A ship, sub or aircraft.	
Platform ID	The track number assigned to a controllable platform. In a Multiplayer game, each player-controlled platform has a unique Platform ID starting with 1001. The next player platform ID is incremented by 300. (1301, 1601, 1901 etc.) up to 30 players.	Tracks marked by each Ownship start with the next number following the Ownship Platform ID up to 298 contacts per Ownship.
Relative bearing	The direction expressed as a horizontal angle normally measured clockwise from the forward point of the longitudinal axis of Ownship.	

Term	Definition	Game Info
Seawolf	Any controllable U.S Seawolf (SSN 21) class nuclear submarine.	
Snapshot	A torpedo shot down a specific line of bearing.	
Tag	A number assigned by the FFG towed array system to detected frequencies.	
Track	Anything detected visually or by one of your ship's sensors. A track is sometimes referred to as a contact	These numbers are internal to the Towed Array and are not the same as a Track number (Track ID.)
Track ID	An alphanumeric or 4-digit numeric designation assigned to a contact when it is marked by an Ownship Sensor or reported by the Link. Sometimes referred to as a Contact ID.	When commanding a sub, track IDs consist of a letter with a number appended (e.g. S01, E01, R01, V01). When commanding an aircraft or the FFG, Track IDs consist of a 4-digit designation based on Ownship's Platform ID.
Tracker	A device used to automatically follow a sonar signal to which it is assigned.	When a tracker is assigned to a sonar contact, periodic updates on the contact's bearing are sent to TMA and/or Nav Map
True bearing	The direction to an object from a point, expressed as a horizontal angle measured clockwise from true north.	



## APPENDIX C: SUBMARINE MAX & MINS

This table shows important depth and speed information as modeled for all controllable Submarine classes in S.C.S. – *Dangerous Waters*. These depths indicate the ordered depth necessary to place the indicated deployed mast approximately one meter above the surface of water. These depths are valid at sea state one. Depths will vary in heavier sea states.

Depth on U.S. submarines is measured and ordered in feet. Depth on the Russian and Chinese submarines is measured and ordered in meters.

- ✓ **Note:** Traveling at speeds in excess of those listed following a mast depth will break the indicated mast unless the sail is out of the water.

	<b>Seawolf</b>	<b>688(I)</b>	<b>Akulas<sup>1</sup></b>	<b>Kilo<sup>1</sup></b>
Surfaced Depth	Sail breaks surface: 46 ft  Fully Surfaced: 27 ft	Sail Breaks surface: 49 ft  Fully surfaced: 32 feet	Sail breaks surface: 18 - 17 m <sup>1</sup>  Fully Surfaced: 9 meters	Sail breaks surface: 15 m  Fully Surfaced: 7 m.
Max Operating Depth modeled <sup>2</sup>	1,968 ft (600m)	1,476 ft (450 m)	520 m (1,707 ft)	300 m (984 ft)
Periscope Depth	61 ft 10 kts	63ft 10 kts	20 m 10 kts	19 m 10 kts
Radar Depth <sup>3</sup>	51ft 8 kts	54 ft 8 kts	19 m 8 kts	17 m 8 kts
Radio Mast Depth (Comms Depth)	59 ft 10 kts	63 ft 10 kts	20 m 10 kts	19 m 10 kts
ESM Mast Depth	58 ft 10 kts	61 ft 10 kts	19 m 10 kts	18 m 10 kts
Snorkel/Ventilation Depth	54 feet 10 knots	56 feet 10 kts	19 m 10 kts	17 m 10 kts
Towed Array <sup>4</sup> breaks at speeds = or >	40 kts	Does not break at Max speed	Does not break at Max speed	NA
Floating wire breaks at speeds = or >	18 kts	18 kts	18 kts	18 kts

<sup>1</sup> The Akulas and Kilos measure depth in meters. These depths are not as precise as those measured in feet. The actual depth at which the mast or sail breaks the surface may be somewhere in the distance between the stated depth and one meter above the stated depth. This difference will be very noticeable in heavy sea states.

<sup>2</sup> Maximum operating depth is the maximum depth at which you can routinely operate. Crush depth is always below this stated number. How much below that will be slightly different every time you play. You can go below the stated operating depth without imploding. You will never know your exact crush depth.

<sup>3</sup> Radiating while the radar mast is submerged destroys the Radar. Be sure you are at Radar depth before raising the Radar Mast.

<sup>4</sup> Backing up or extreme turns and depth changes may cut the towed array.

## APPENDIX D: IN-GAME SENSORS

This table shows the names for sensors as modeled for the controllable platforms in S.C.S. – *Dangerous Waters*. These sensor names appear in the DDI in the Source field.

<b>Seawolf SSN 21</b>	<b>Sensor</b>	<b>Description</b>
Seawolf SSN 21	BSY-2 Act	Medium Frequency Active Sonar
Seawolf SSN 21	WLQ-4	ESM Sensor
Seawolf SSN 21	BSY-2 PNB	Passive Hull Sonar
Seawolf SSN 21	BSY-2 PBB	Passive Sphere Sonar
Seawolf SSN 21	WLR-9	Active Intercept
Seawolf SSN 21	TB-16	Towed Array (Port)
Seawolf SSN 21	TB-29	Towed Array (Starboard)
Seawolf SSN 21	BSY-2 WAA	Wide Aperture Array
Seawolf SSN 21	AN/BPS-16	Radar
<b>688(I) SSN</b>	<b>Sensor</b>	<b>Description</b>
688(I) SSN	BQQ-10 Act	Medium Frequency Active Sonar
688(I) SSN	BLQ-10	ESM Sensor
688(I) SSN	BQQ-10 PNB	Passive Hull Sonar
688(I) SSN	BQQ-10 PBB	Passive Sphere Sonar
688(I) SSN	WLY-1	Active Intercept
688(I) SSN	Port TB-16	Towed Array (Port)
688(I) SSN	Stbd TB-16	Towed Array (Starboard)
688(I) SSN	AN/BPS-15	Radar
<b>Akula SSN</b>	<b>Sensor</b>	<b>Description</b>
Akula SSN	MGK-503 Act	Medium Frequency Active Sonar
Akula SSN	Bukhta	ESM Sensor
Akula SSN	MGK-503 PNB	Conformal Array (Passive Narrowband)
Akula SSN	MGK-503 PBB	Cylindrical Array (Passive Broadband)
Akula SSN	Pelamida TA	Towed Array
Akula SSN	MRK-50	Radar

<b>Kilo SS</b>	<b>Sensor</b>	<b>Description</b>
Kilo SS	MGK-400 Act	Medium Frequency Active Sonar
Kilo SS	MRM-25EM	ESM Sensor
Kilo SS	MGK-400 PNB	Conformal Sonar
Kilo SS	MGK-400 PBB	Cylindrical Sonar
Kilo SS	MRK-50	Radar
<b>MH-60R</b>	<b>Sensor</b>	<b>Description</b>
MH-60R	AQS-22 Act	Dipping Sonar (Active)
MH-60R	AQS-22 Pass	Dipping Sonar (Passive)
MH-60R	ALQ-210	ESM Sensor
MH-60R	AN/APS-147	Radar
<b>O.H. Perry FFG</b>	<b>Sensor</b>	<b>Description</b>
O.H. Perry FFG	SQS-56 Act	Hull Sonar (Active)
O.H. Perry FFG	SLQ-32	ESM Sensor
O.H. Perry FFG	SQS-56 PBB	Hull Sonar (Passive)
O.H. Perry FFG	SQR-19	Towed Array
O.H. Perry FFG	AN/SPS-49	Air Search Radar
O.H. Perry FFG	AN/SPS-55	Surface Search Radar
<b>P-3C Orion</b>	<b>Sensor</b>	<b>Description</b>
P-3C Orion	ALR-66	ESM Sensor
P-3C Orion	AVX-1	Infrared Sensor
P-3C Orion	AN/APS-137	Radar

# APPENDIX E: CREDITS

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## SONALYSTS TEAM

**Producer:** Kim Castro

**Associate Producer:** James Carlson

**Programmers:** Renee Anderson, Keith Aubin, Dave Capizzano, James Carlson, Rob Costello, Mel Davey, John Hazard, Michael Kolar, Cindy Spellman, Tod Swain

**Game Design:** Keith Aubin, James Carlson, Michael Kolar, Tod Swain

**Scenario Design:** Keith Aubin, Christopher Beall, James Carlson, Kim Castro, Chester Helms, Bill McConnell

**Graphic Design And Animation:** Michael Bailey, Brian Barnes, Teresa Bonillo, Christopher Conway, Stephen Freitas, Michele Granville, Christopher Ilvento, Kattie Konno-Leonffu, Jay Nilsen

**Graphic Interns:** Will Cook, Ben Insler, Rory Panagotopoulos, David Strick

**Original Music Composition:** Curt Ramm

**Sound Design:** James Carlson, Robert Costello, Curt Ramm

**Voice Talent:** Keith Aubin, Michael Bailey, Robert Bunker, Brian Barnes, David Capizzano, Jamie Carlson, Kim Castro, Steve Cerilli, Simon Chan, Robert Costello, Duncan Dickson, Stephen Featherston, Val Grozak, Ronald Hayden, John Hazard, Jake Kahn, Michael Kolar, Robert Kurzawa, Donald LaForce, Evgenia Neff, Edward Noyes, Curt Ramm, Kenneth Richters, Floyd Rogers, Jonas Sanchez, Paul Santamaria, Ronit Smidt, Brian Van Volkenburg, Seth Zowader

**Additional Programmers:** Christopher Cyr, Kyle Kolva, Michael Young

**Research And Database:** Sue McConnell

**Documentation:**

**Writer:** Sue McConnell

**Editing and Support:** Stephen Featherston, Stephen Freitas, Chester Helms, Robert Price, Cindy Spellman

**Subject Matter Experts:** Robert Bunker, Dave Bartholomew, Geary Boulrice, Daniel Bowdler, David Coleman, Tony Cowden, Charles Dye, Michael Giannelli, Lance Hamilton, Michael Hewitt, Dick Hodges, CC Johnson, Terry Jones, Robert Kurzawa, Jeffrey Lemmon, Frederick Litty, Bill McConnell, Jerome Provencher, Mark Tarantelli, Jack Wayne, Raymond Woolrich

**Legal And Contracts:** Lawrence Clark, Lisa Estabrooks, Mirek Fal, Suzanne Lemmon, A. Lisa Mackie, Evgenia Neff, Diane Rogoff, David Samuelson, Greg Vymola, Lyle Watkinson

**BETA Phase Project Management:** Jodi Imms

**Testers:** Keith Aubin (Lead), Geary Boutrice, George McCullen, Jerome Provencher, John Smalley, Bence Strickland, Basha Wynne

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## **BATTLEFRONT TEAM**

Martin van Balkom, Fernando J. Carrera Buil, Matt Faller, Steve Grammont, Charles Moylan, Dan Olding

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## **BETA TESTERS**

Wyatt "WWB" Barnett, Marco Bergman, Rob "jrcar" Carpenter, Martin "Ramius" Gibson, Tim "TimmyG00" Grab, Tim "CaptainX" Graham, Craig "Harv" Harvey, David "Diemos" King, Rob "Mace" Knight, Frank "Smuook" Loethen, Bill "Subguru" Nichols, Dan "Kwazydog" Olding, Chris "little evil" Orosz, Tim "Rune" Orosz, Willem "Fish" Peschier, Marc "OKO" Rannou, John "isteed" Steed, Neal "Subsim" Stevens, Raul "Furia" Ortiz de Urbina, Bill "Actor" Valencia, Tom "Thomasew" Watt, Jonathan "Ritual" Watters

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## **3RD PARTY SUPPORT**

**Hardware Testing:** iBeta

**Original Music Composition:** Chad Kelly, Aberrant Sound

**Marketing And Public Relations:** Lone Star P.R.

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## **SPECIAL THANKS TO**

**The Sonalysts Partnership**

**TerrainBase:** National Geophysical Data Center (NGDC) of the National Oceanic and Atmospheric Administration (NOAA)

**Gtopo30:** Earth Resources Observation Systems (EROS) Data Center, of the United States Geological Survey (USGS)

**Walsh's Arctic and Antarctic Sea Ice Concentration Analyses:** National Snow and Ice Data Center (NSIDC), of the University of Colorado (Special thanks to Diana Starr for all her help.)

**Global Ecosystems:** Earth Resources Observation Systems (EROS) Data Center, of the United States Geological Survey (USGS)

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**Naval Institute Press:** Frederick Rainbow, Editor

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